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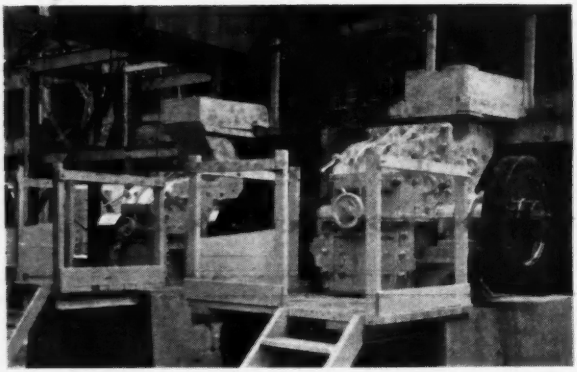

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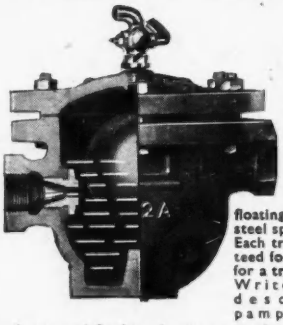

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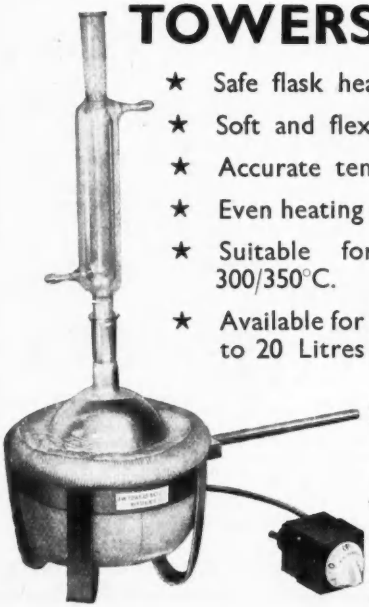

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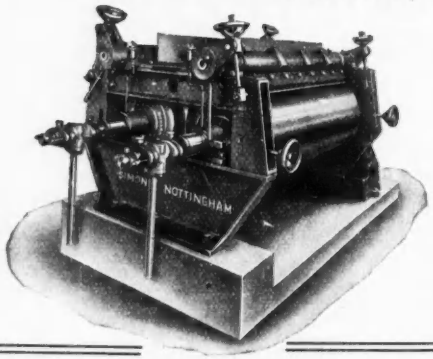

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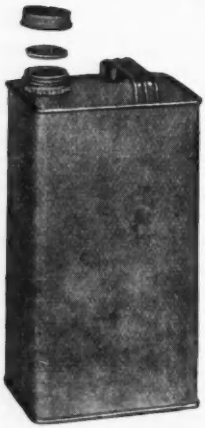
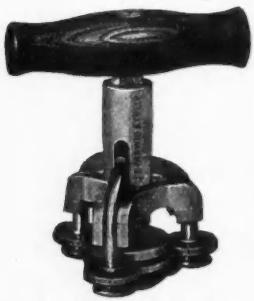


Square can showing patent screw neck. **Patent No. 382,380**



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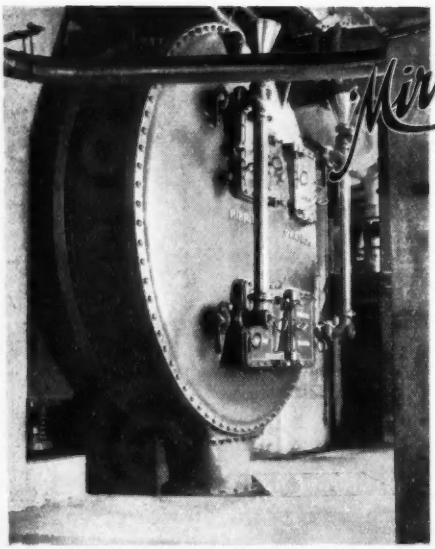

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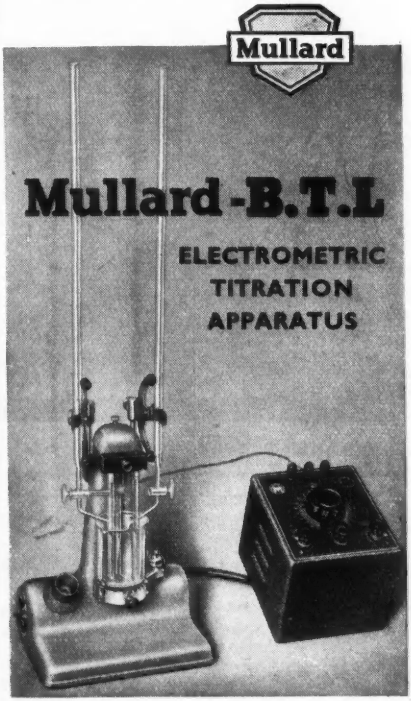

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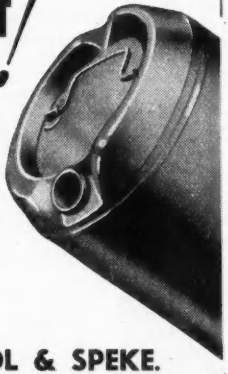

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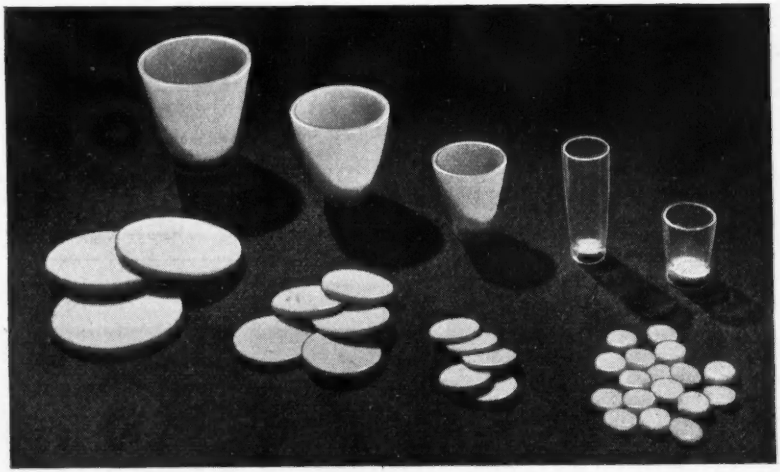

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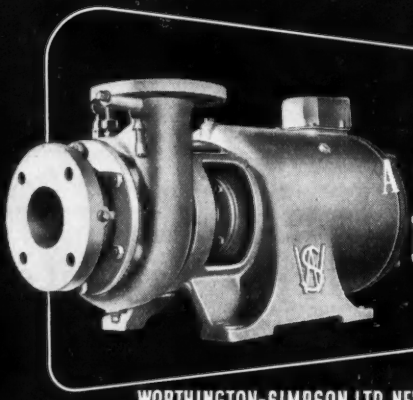

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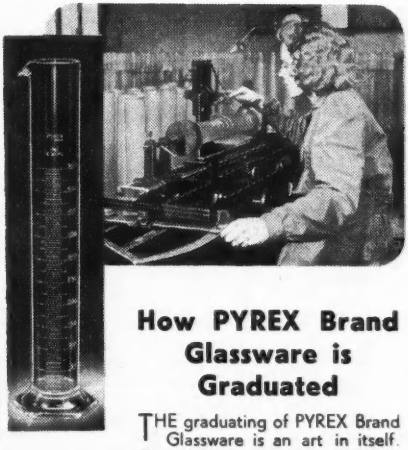

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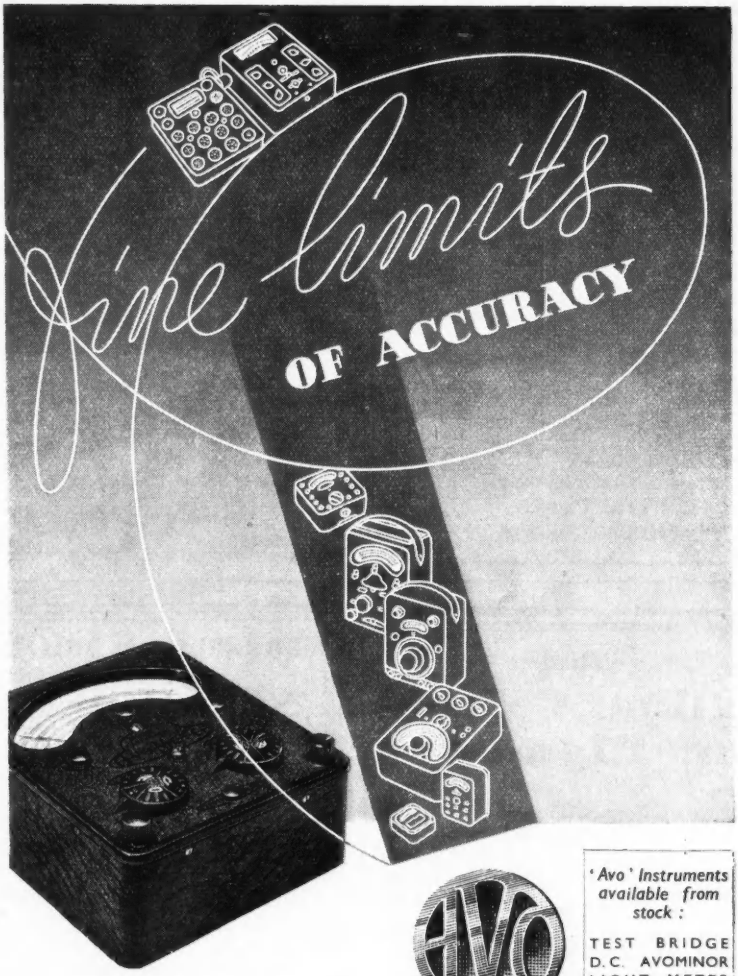

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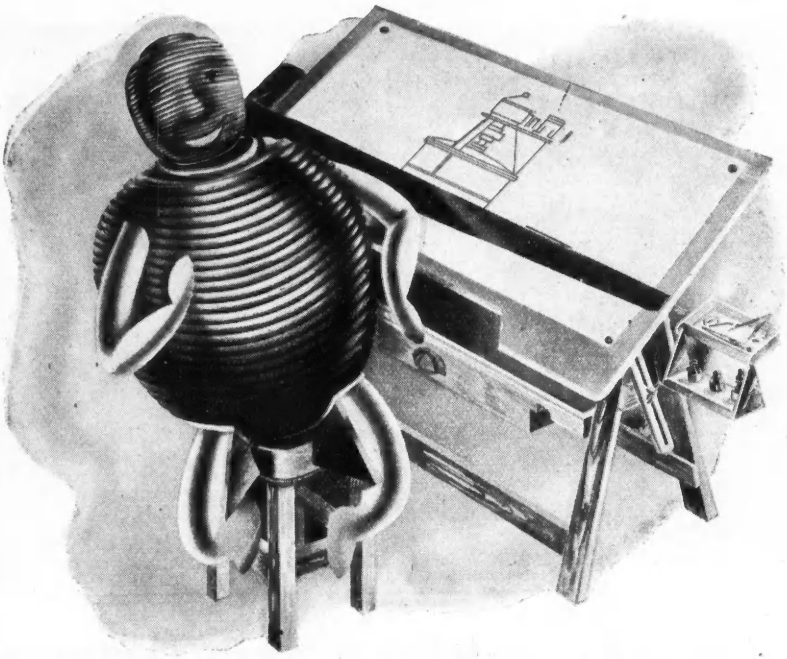

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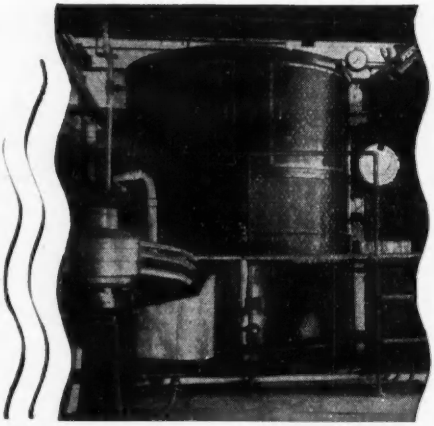

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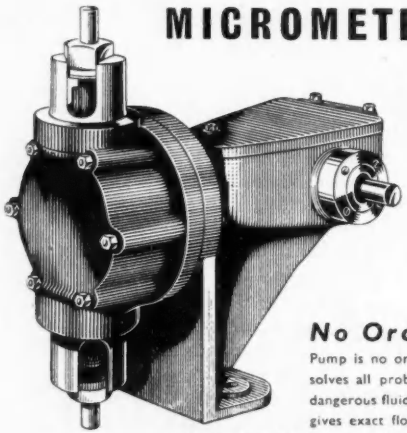

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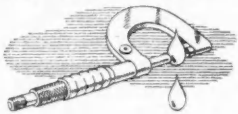

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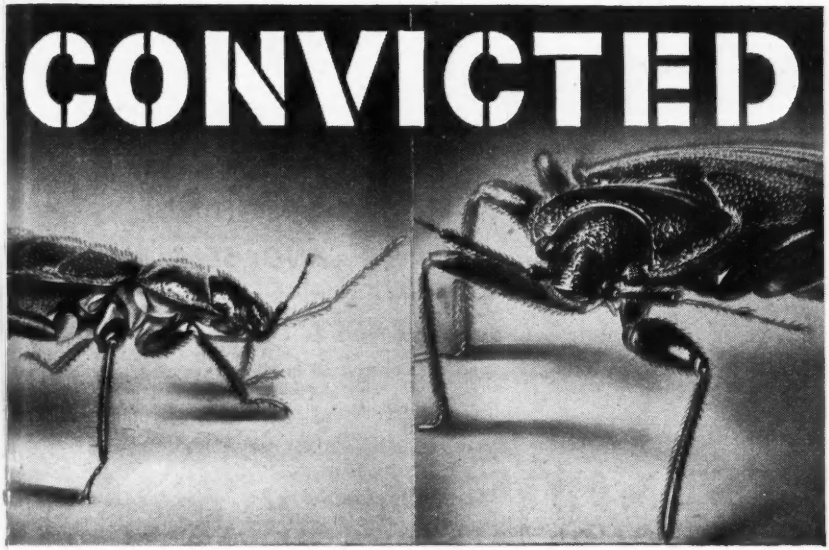

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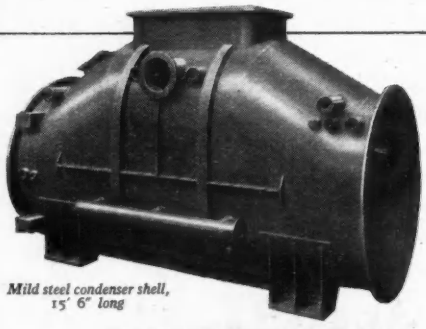

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Prizewinners

THOSE privileged to attend the reception given to the Nobel Prizewinners by the Federation of British Industries cannot fail to have noted the testimony it paid to the remarkable change which has occurred in their own lifetime in the attitude of "big business" to science. There have always been, since the industrial revolution, business concerns based almost entirely on scientific knowledge. It can be argued, for example, that when Abraham Darby discovered how to use coke for the smelting of iron he was basing his experiments on the scientific discoveries of those who had gone before. Such names as Bessemer, Siemens, Mond, Chance, Lever, Perkin, Messel, Muspratt and Parsons, to mention only a few in diverse walks of industry, had employed science in their business to good effect. But, by and large, the scientist as such was not concerned with business and there was a certain amount of mutual distrust and antagonism between the two spheres. To enter business was repugnant to many scientists, and the businessman regarded the scientist as a dreamer whose ideas could be of little practical value.

Profound change has been brought about by the world-shaking events of the last 35 years. In the words of the President of the FBI, Sir Frederick Bain, it has needed two great and devastating wars to bring about a wholehearted demonstration by industry of pleasure at the authoritative recognition by the Nobel Committee of the work of great English scientists "and at the same time sincere recognition of what industry owes to science as represented by them." Sir Frederick went on to say that from his experience, "I can assure you that if any of you have any illusions that great scientists are not men of affairs, the sooner you lose that illusion the better. During the war I learned how the scientist and the industrialist could work together for a common objective. I got to know, and to know for sure, that this old country in its time of peril was not only, as in peace, a country of the questing mind and free experimental approach, but was still above all a place for the sharing of ideas, improvisation in emergency, and effectiveness in application of the work of scientists."

Not since 1904, when Sir William Ramsay and Lord Rayleigh were awarded them, have the prizes for chemistry and physics been simultaneously won by British scientists. The award of the Nobel Prize in Chemistry to Sir Robert Robinson, and the Nobel Prize for Physics to Sir Edward Appleton, was a striking tribute to the work done by British scientists. On the value of their work we shall have more to say later. Meanwhile, all scientists have been greatly heartened by the high measure of recognition now being accorded by Government and industry alike to our eminent scientific men and to the promotion of science and scientific methods throughout Great Britain and the Empire.

Science has manifestly come into its own. Scientists in the past four decades have been given their opportunity and with that opportunity has come responsibility. Sir Frederick Bain, from his wide experience of men and affairs, is convinced that

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great scientists can be effective men of affairs, and it is more than ever essential now that they should be. Valuable and important as scientific work is, it is equally important that industrial scientists in their flights of fancy should keep at least one foot firmly planted on the ground.

If, however, industry rightly demands of its scientists that one of their feet should be in firm contact with terestrial things, that is no reason why the other should not occasionally kick over the industrial traces which confine attention to severely practical issues. Many of the greatest discoveries have come to those who follow by-ways that have unexpectedly opened to them. Regard, however, must be had to those problems that require immediate solution and when some apparently fascinating object distracts attention from practical work, it cannot be pursued to the detriment of immediate necessities.

It is objected that scientists tend to be unpractical. Sir Frederick Bain's experience shows that this is not a fundamental defect of their training, nor is it a characteristic that cannot be avoided. In these circumstances we suggest that the chemist for his part, has an additional duty to industry in that he must master not only the chemical sciences, but the economics of business management also, so that his advice, when given, shall be more closely attuned to practical possibilities.

The scientist, as we have said, has the ball at his feet; what he does with it depends on himself. Economists, accountants, bankers, engineers are all found frequently on the boards of important companies. The chemist, the scientist, is less often among them. Why? May it not be that the other foot is still not kept firmly enough on the ground, that the chemist is too prone to look on his science as the end in itself? The industrialist, on the other hand, regards all science as a tool to be used in the main business of making useful goods of saleable quality to be sold at a profit. The fact that he cannot dispense with the scientific "pathfinder" confers on the chemist an opportunity which must not be squandered.

FOUR-SHIFT SYSTEM ADOPTED

SUCCESSFUL operation of a four-shift system in a chemical factory, enabling the workmen to take two days' rest in every eight, was referred to by Mr. Kenneth M. Chance, chairman of British Industrial Plastics, Ltd., when he addressed that company's annual general meeting in London last week.

"The system was fully discussed with them beforehand," he said, "and although it involved more work a man-shift and less in the weekly pay packet, was approved on a vote by a large majority. In practice unexpected hardships of a temporary nature resulted, but owing to the good relations between management and workmen and to the help of trades union officials who shouldered the main burden of complaint and explanation, these were not allowed to upset the scheme, with the result that production increased and the cost of wages per ton of product in two processes showed a reduction of 3½ per cent despite a general rise in wages of chemical workers of 5 per cent."

NOTES AND COMMENTS

Better Exports

THE newly released account of export trading in February, in happy conjunction with the advent of spring sunshine, sorely tempts one to believe that the winter of our discontent is at an end. Climatically that may be true; economically that is, of course, conspicuously not in accordance with the facts—notably with the inconvenient fact that our adverse balance of trade, although smaller than at any time since February last year, still makes the menacing total of £31.2 million. It would, however, be a dismal spirit indeed that did not rejoice in the news that February's exports were worth £112.9 million, which is £6.2 million better than the average in the last quarter of 1947 and is the highest total recorded on a day-for-day basis since 1920. Of the same order are the comprehensive records of what was achieved in export trade by the chemical industries. Here the grand total for chemicals, drugs, dyes and colours of £5.709 million is better by rather more than £1 million than the total a year ago and the increase in sales of heavy chemicals alone, above the total for February, 1947, is more than £770,000. Great fluctuations in either direction were, as usual registered in the different groups. Most noticeable in the comparison of February shipments in the two years were the great increases in tar oil and derivatives, sodium compounds and salicylic acid, the substantially improved trading in caustic and disinfectants and the heavy falling off of ammonium sulphate and aluminium oxide.

Shortage of Sodium Chemicals

THE heartening news of the continued increase in the rate of exports is regrettably capable of conveying a more optimistic view of our industrial affairs than is warranted. If rising exports are sustained to any large extent by withholding materials essential to a corresponding increase in home production the result produced within the space of a year or so might be disastrous to our continued pre-eminence as a manufacturing country. Epecially is that true of our chemical processes, from which by chance evidence came to hand simultaneously with the publication of the Board of Trade figures, and acted as a reminder of the continued critical scarcity of some raw materials of chemical industry. In this instance it was yet another evidence that soda ash, basic material of so many industries, is still being provided in wholly inadequate quantities. It came in the form of a notification to THE CHEMICAL AGE from Albright & Wilson, Ltd., that crystalline trisodium phosphate, which was habitually quoted in our monthly chemical price quotations, was no longer available. A fair quantity will, no doubt, continue to be provided for important export industries; but for the general home user the prospect of receiving adequate supplies of the essential sodium phosphates seems to be worsening. Demand, meanwhile, continues to increase, as it must if a balanced industrial economy is to be maintained, and there seems little immediate prospect that the material which would contribute more than any other to freer supplies will be forthcoming in anything approaching pre-war quantities. Further comment would be premature, pending the statement on prospective supplies of soda ash by the President of the Board of Trade, which was awaited with peculiar interest when THE CHEMICAL AGE went to press.

Atomic Heat

AS a red rag to bulls, so apparently is the subject of atomic energy among the nations. In addition to the familiar verbal onslaughts to which the topic gives rise at fairly short intervals in Moscow, the U.S.A. also seems to be strangely sensitive. The *Chemical and Engineering News*, whose headquarters are in Washington, has been dispossessed of its usual judiciously impartial frame of mind by the British film " Atomic Physics " . . . " by whose lopsided theme," it says, " we were genuinely shocked. . . . Except for Einstein, Becquerel, and the Curies, only passing mention, if any, was given to non-British scientists who contributed to nuclear developments. This omission was especially obvious in the case of Americans who were conspicuous by their almost complete absence from recognition in this ' documentary ' film. Their accomplishments were used only where utterly neces-

sary for script continuity and with two exceptions were left anonymous in origin. What a contrast this provides with the Smyth Report where British achievements received their full share of rightful recognition."

Popular Version

ONE of the many answers which might help to turn away the American wrath is that "Atomic Physics" was never intended to be an historical record of nuclear fission with credits to all, however remotely concerned. It seems, however, to have told quite faithfully the early chapters of a story of which subsequent developments are in this country largely matter for conjecture. In general, we are, however, perfectly ready to agree that popular expositions of contemporary scientific wonders conspicuously lack the scientific detachment the subjects seem to call for, which the atomic energy film displayed in a wholly unusual degree. It compared very favourably indeed with—for example—the detailed account which appeared not very long ago in an American magazine of international repute of how American scientists pioneered and developed radar—nearly a year after what was then known as "G.L." was in use on A.A. gun-sites in this country.

Industrial Safety

"WHAT is a cynic's definition of a committee?"—asked Mr. G. P. Barnett, H.M. Chief Inspector of Factories, when he addressed a large meeting of the four London industrial groups of the Royal Society for the Prevention of Accidents in London last week. "It is a body of people who individually do nothing, and collectively decide that nothing can be done." He was discussing the functions of safety officers and safety committees, and emphasising the important rôles they played in the elimination of industrial accidents. While there had been considerable improvements in many sections of industry, there was no room for complacency. He deplored the tendency for members of some safety committees, when considering causes of accidents with a view to finding remedies, to remark: "How stupid," "that was careless," or "that should have been avoided." That, he said, was no figment of the imagination. He had recently been present at such a committee meeting. This was an attitude of mind which, happily not widespread, served however to show that the subject was not always approached in a positive and practical manner. The chemical industries are, of course, not blameless in this respect, but the speaker made it evident that he had predominantly other spheres in mind, not excluding power press shops, where the increased toll of accidents in 1946 has called for anxious attention by the Factory Inspectorate. The relationship between the inspectorate and chemical industry seems at the moment to come very close to the ideal, providing at the same time the closest kind of liaison on all debatable points and a recognition by each of the other's ability to deal responsibly with its own affairs. Much of the credit for this must be given to the ABCM, whose "Model Safety Rules" point the way towards constructing a system of voluntary safeguards which in the end should render regimentation superfluous.

Royal Society

Fellowships for Distinguished Chemists

AT a meeting last week of the Royal Society, 25 prominent scientists and engineers were elected into the Fellowship. Included in the list were the names of six chemists, well known for their activities in various branches of research work.

Cambridge University was represented by Dr. Frank Philip Bowden, lecturer in physical chemistry and noted for his contributions to the study of friction and lubrication, and Dr. Dorothy Mary Needham, distinguished for her researches on the biochemistry of muscle, and whose husband, Dr. Joseph Needham, was elected fellow in 1941.

Others receiving recognition were Stanley Peat, reader in organic chemistry at Birmingham University, who has contributed much to the study of carbohydrates; Prof. Gilbert Wooding Robinson, professor of agricultural chemistry at the University College of North Wales, an expert on soils; and Ernest Harold Farmer, assistant director and senior organic chemist of the British Rubber Producers' Research Association.

An overseas chemist, E. W. R. Steacie, director of the Division of Chemistry, National Research Council of Canada, well-known for his work on gaseous chemical reactions, was also elected to the Fellowship.

INDUSTRY'S TRIBUTE TO SCIENTISTS

Nobel Prizewinners Honoured by the FBI

BEFORE a crowded lecture theatre at the Royal Institution on Friday last week, the FBI paid public tribute to the 1947 Nobel prizewinners—Sir Robert Robinson and Sir Edward Appleton. "The occasion has special significance," said Sir Frederick Bain (FBI president) in his opening address. "Not since 1904, when Sir William Ramsay and Lord Rayleigh were awarded them, have the prizes for chemistry and physics come to this country undivided and undisputed. We are proud of our scientists. You, Sir Robert Robinson, and you, Sir Edward Appleton, have brought honour to our country, won distinction for yourselves, and we of British industry salute you."

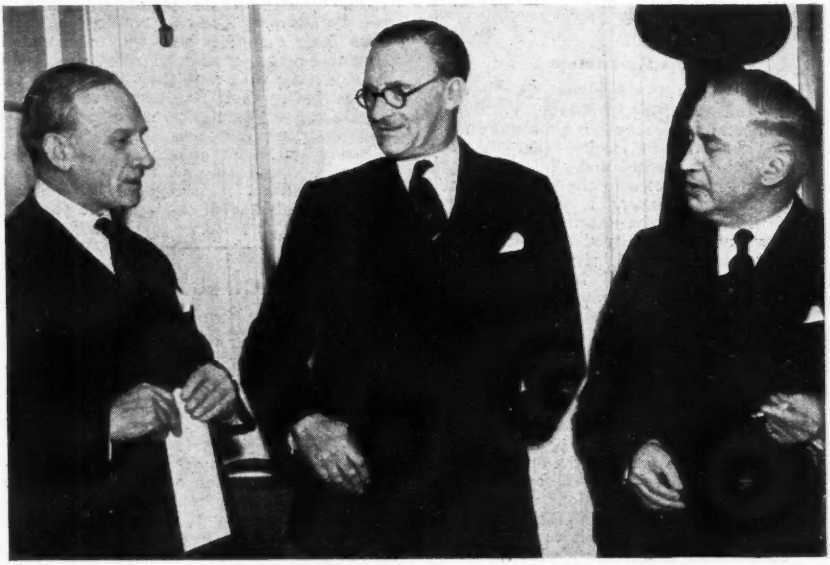
Chemistry in Industry

For twenty minutes, Sir Robert Robinson reviewed "The Scope of Organic Chemistry" and its relation to industry.

"Organic chemistry occupies a central position in the sciences," he said. "It is the life of the dyestuffs industry and makes large contributions to a number of others. Continued progress in organic chemistry is very necessary. Essential organic chemicals played an important part in the war. They are necessary for security and the exercise of military power. Priority must be given to building it up. We are spending too much on 'cake,' and too little on 'bread-and-butter,'" he warned.

Remarking on the relative importance of schools, universities and factories, Sir Robert called for increased remuneration for teachers. "Science teachers must be recruited," he insisted, ". . . and retained in the schools." Universities had to be considerably enlarged and modernised. Universities and technical colleges had the responsibility of providing the trained staff for laboratories. They must not be impeded in that important work.

"The future holds many rich discoveries that will completely overshadow our present achievements," he declared. There had to be a scientific control of our resources. "If sugar is in short supply, there is still plenty of sand." Silicons were important materials because they contained carbon, and they might still eke out carbon supplies.



Sir Robert Robinson, Sir Frederick Bain, FBI president, and Sir Edward Appleton at the reception

Changing Concepts

Sir Edward Appleton prefaced his description of the functions of science and scientists in industry by recalling the words with which "one of the greatest physicists of all time, Clerk Maxwell," began a lecture nearly 100 years ago: "An atom is a thing that cannot be cut in two."

"Such a conception of the atom," said Sir Edward, "was entirely consistent with the scientific knowledge of the day.

"The case of the atomic bomb is, of course, exceptional, but it does illustrate most strikingly the rapidly increasing momentum of scientific and technological progress, and of the way in which the gap between scientific discovery and practical use can be, is being, and will be, more rapidly bridged.

"It always seems to me convenient to think of the pattern of scientific research effort in this country as being shaped like a triangle, with university science at one corner, Government science at another and industrial science at the third. The advantage of this method of portrayal is that it is seen that each corner is linked to the other two by way of the connecting sides. For it is absolutely vital that there should be no segregation—no isolation—of research effort. Each corner of research is vitally dependent for stimulus and assistance on the other two.

Less Restriction

"The scientific workers in government and industry employs the same methods and approaches his problems in the same way as his university colleagues, but the fields he can enter and explore must of necessity be restricted by the interests of the organisation he serves. I would say, however, without any hesitation, that in both Government and industrial laboratories, the more liberally these restrictions are interpreted, the better will be the scientific health of the men who work in them.

"This is not the time to say much about DSIR's own achievements or about the way in which we have tackled our job. Broadly, we have tried in every way to assist industry in bringing science to bear on its problems, and above all we have encouraged that close and habitual association between industry and science, which is essential if advantage is to be taken of the opportunities of applying major scientific discoveries when they arise. In all our actions we have recognised that while it is impossible to plan discovery it is quite possible to plan for it.

"There is no doubt that, with the ever-increasing complexity of both science and industry, the proper use of scientists in industry has become a managerial problem of the first magnitude. This has been recognised by the FBI in the formation of your Industrial Research Committee. This committee is warmly to be congratulated on the series of stimulating conferences it has held in different parts of the country, and on the valuable surveys it has produced on the present position of research in industry. We, in DSIR, have greatly valued the close collaboration which has grown up between your committee and our staff.

"One of the main reasons which make the proper use of science in industry a managerial problem lies in the rapid rate of scientific progress to which I have already referred. Scientific knowledge is growing with amazing speed and the opportunities for applying it are so enormous and so varied that it is essential to be selective. No firm, not even the largest, could hope to carry through successfully to the production stage all the ideas which seem to be feasible and attractive. Selection involves many problems, the solution of which depends on other factors besides purely scientific ones.

"Curious Creatures"

"I hope I may be forgiven by representatives of management present if I digress at this point to tell them something about the human characteristics of their scientific staff. Scientists are curious creatures in many ways but, like most other folk, they have their ambitions and they respond to stumulus and incentive. I think it can be claimed that the thing they desire most is the esteem of their fellows in the scientific world. For stimulus they require contact with their scientific brethren—scientific talk—the try-out of one man's ideas on another—criticism—and so on. As for incentive, we must always remember the enthusiasm and the challenge of the scientific chase.

CLEANER COAL IN PROSPECT

THE problems which "dirty coal" has consistently created for industrial users, are likely to be considerably reduced as a result of orders recently placed by the National Coal Board for coal preparation plants, among which are included several large washeries. In the course of the next 18 months to 2 years, it is expected that a hundred or more major and minor installations will be placed on order. Their effects will not become apparent to industry, however, until at least 1950. At the present time, the estimated proportion of mechanically washed coal available to industry is estimated at 47 per cent. The N.C.B. plant-purchasing programme hopes to raise this figure to about 66 per cent.

RISING EXPORT TOTALS

Some Large Chemical Increases in February

THE continued rise in total exports of United Kingdom goods in the month to £112.919 million is the encouraging feature of the *Trade and Navigation Accounts of the U.K.* for February. Although this total, because of the shortness of February, does not reached the large total recorded in the previous month, it was proportionately the largest since 1920. The adverse balance of payments was also very substantially reduced to £31.2 million, despite the fact that there were large increases in imports of some raw materials.

In the 12 months contrast (with February, 1947) provided by the current accounts are reflected large rises in overseas sales in all main branches of chemical industry. Total sales of chemicals, other than drugs and dyestuffs, in February were valued at £3.3 million, compared with £2.526 million a year before. The corresponding figures for drugs and medicines were £1.052 million (against £969,814) and for dyes, and ancillary products £499,739 (against £593,524). The total value of sales of all chemical groups at £5.709 million reflects an increase since last February of more than £1 million.

Among the most pronounced changes in February by comparison with a year ago were the practical elimination of exports of benzol, the great increase in tar-oil products (to 4.359 million gals.) and of sodium compounds (to 228,540 cwts.); and substantial improvement in disinfectants, insecticides, weed-killers and fertilisers. The principal import and export returns were as follows:

CHEMICAL EXPORTS

	Feb. 1948	Feb. 1947
	Cwt.	Cwt.
Formic acid	2912	2524
Tartaric acid	1504	2815
	Tons	Tons
Aluminium oxide	50	1289
Sulphate of alumina	2327	2377
Ammonium sulphate	16,807	27,222
Ammonium nitrate	7884	5278
	Cwt.	Cwt.
Bleaching powder	22,351	32,452
Calcium carbide	5124	7277
	Gals.	Gals.
Benzol	70	13,913
Cresylic acid	205,827	206,253
Tar oil, creosote, anthracene oil, etc.	4,359,474	296,297
	Cwt.	Cwt.
Naphthalene	1592	2123
Nitrocellulose	2515	1046
Disinfectants, insecticides, weed-killers, etc.	60,441	49,329
	Tons	Tons
Copper sulphate	6250	2124
	Cwt.	Cwt.
Glycerine	87	3996
Nickel salts	4802	3790
Lead acetate, litharge, red lead, etc.	4901 Tons	10,038 Tons
Magnesium compounds	613 Cwt.	717 Cwt.
Potassium compounds	5817 Tons	3206 Tons
Salt	10,356 Cwt.	8930 Cwt.
Sodium carbonate	228,540	80,733
Caustic soda	183,755	125,132
Synthetic sodium nitrate ...	—	4068
Sodium silicate	5070	5040
Sodium sulphate	3663	20,091
Total value of chemical manufactures, excluding drugs and dyestuffs	£3,300,041	£2,526,126
	Oz.	Oz.
Quinine and quinine salts ...	128,942 Mega units	66,750 Mega units
Penicillin	295,319 International units	56,414 International units
Insulin	998,287 Lb.	529,644 Lb.
Acetyl-salicylic acid	28,097	148,986
Total value of drugs, medicines and preparations	£1,052,385	£969,814
Total value of drugs and dyestuffs	£499,739	£593,524
	Cwt.	Cwt.
Chemical glassware	1420	1067
Value	£41,978	£37,052
	Tons	Tons
Furnace plant	615	175
Value	£97,250	£27,966

CHEMICAL IMPORTS

	Cwt.	Cwt.
Acetic acid	22,302	6531
Boric acid	800	7030
Tartaric acid	—	1000
Borax	5200	24,284
Bromine and bromides	494	99
Calcium carbide	13,892	590
Coal tar products (excluding benzol and cresylic acid) ...	9477 Tons	4041 Tons
Ammonium phosphate	—	1655
Manufactured fertilisers	25,369 Cwt.	16,431 Cwt.
Potassium chloride	529,412	209,581
Potassium sulphate	50,700	30,330
Other potassium compounds ...	3121	2671
Sodium nitrate	139,547	19,940
Carbon black	62,461	53,178
Total value of chemicals, drugs, dyes and colours	£2,688,722	£1,325,858

Encouragement For Wool Chemists.—Leeds University has received a gift of £10,000 from the International Wool Secretariat for the purchase of equipment for the new textile laboratory. A start on the building of the laboratory, which was made possible by a grant of £20,000 in 1946 by the Worshipful Company of Cloth Workers of London, was made in December. On the first floor will be several laboratories for research work, and on the second a large laboratory in which undergraduates will be given prescribed work in the chemistry of woollen materials.

Chemical Raw Materials

Relaxation of Controls Essential

IN the course of his address to the 41st annual general meeting of the Anchor Chemical Co., Ltd., in Manchester last week, Mr. T. H. Hewlett, chairman, said there had been a continued shortage of vital raw materials (THE CHEMICAL AGE understands this was a reference to stearic acid and kindred products), and in some cases this had been more pronounced than during the previous year.

Controls on some of the raw materials not produced in the U.K., however, such as channel carbon black and talc, had been relaxed. This had helped considerably. There were other controls which still hampered the company's efforts, however, and Mr. Hewlett looked forward to their relaxation or removal to enable energies to be diverted in other directions.

SHIPMENTS TO PALESTINE

AS a result of urgent representations to the Director of Customs, Palestine, cargo recently loaded, or at present being loaded in this country for Palestine, is to be considered exempt from the new financial regulations.

The original ruling (THE CHEMICAL AGE March 20), which followed the exclusion of Palestine from the sterling area, said that any goods arriving there against import licences would not be permitted entry if finance other than by confirmed credits were proposed, unless shipment were made before March 15. This regulation would have affected many consignments.

The exempted shipments include cargo loaded on the *Empire Nerissa*, which left Liverpool on March 18, the *Preston* which sailed from Middlesbrough on March 23 and the *City of Hereford*, due to leave London last Thursday. Applications for licences to import cargo by later sailings are to be considered only if payment is made against letters of credit established in Palestine.

Expropriation of Oil Companies

ASKED in the House of Commons this week for a statement about the treatment of British oil companies in Rumania, Mr. Mayhew said that the policy of the Rumanian Government appeared to aim at gaining possession of British-owned oil companies without payment. The British Government had supported and would support those companies which had claims to make. The Rumanian Government had appointed administrators to two British-owned companies, one of which was the Astra Romana, the largest oil company in Rumania.

Official Notices

More Toilet Preparations.—The Board of Trade has decided to increase the value of manufacturers' licences for the supply of toilet preparations on the home market as from April 1, 1948, on which date amendments to existing licences valid till June 30, 1948, will be issued.

This increase in licence values is an interim arrangement, which will cease to operate on June 30, 1948. As from July 1, 1948, the following arrangements will be made:—

All registered firms will receive basic licences for six months at an increased rate of 50 per cent of their Standard Period figure with a minimum increase of £437 or, if preferred;

37½ per cent of their Standard Period figure and, in addition, one quarter of the bonus earned during the last calendar year for which returns are available. Firms wishing to take advantage of this alternative must apply to the Board of Trade before June 1, 1948, to do so.

Bonus rates will be changed. From July 1 the "automatic" bonus will be at a flat rate of £1 additional home trade for each £1 of achieved exports, for all firms. Where exports have in any three-monthly period commencing July 1, 1948, exceeded 10 per cent of the manufacturers' Standard Period figure, an additional bonus at the rate of £1 home trade for £1 exports may be claimed, and at the rate of £2 for £1 for exports exceeding 20 per cent. Licences necessary for these additional bonuses will be granted only on application to the Board of Trade.

It should be noted that although the value of licences is being increased, it is not anticipated that additional raw materials, packaging, etc., will be available to the industry, and no claims for additional supplies of such materials, based on the permitted increase in home trade, will be entertained.

Electrodepositors' Conference

An interesting curriculum has been drawn up by the Electrodepositors' Technical Society for the annual conference to be held at the Imperial Hotel, Temple Street, Birmingham, on Thursday and Friday, April 15 and 16. The first day's session will deal with "Automatic and Manual Polishing Methods, Machines and Technique," and, following it, the society will hold the conference dinner in the Connaught Room, Birmingham. Friday's session deals with "Developments in American Plating Practice." Visits to the Birmingham works of Rover Company, Ltd., W. T. Avery, Ltd., and Hy. Wiggin & Co., Ltd., have also been arranged.

PREVENTION OF ACCIDENTS

Functions of the Safety Officer

A PROPOSAL to publish information on accidents in chemical factories was mentioned by Mr. G. P. Barnett, H.M. Chief Inspector of Factories, when he addressed a meeting of safety officers and other industrial representatives on the subject of Industrial Accident Prevention at Friends House, Euston, N.W.1, on March 17. Such a document, he said, would contain statistical matter, and lay down voluntary measures for reducing accidents to a minimum.

In the first place, said Mr. Barnett, one should appreciate some of the basic points about accidents. They were entirely unexpected and unpremeditated, and any investigation into the causes must be final. The whole aim, therefore, must be to eradicate the cause completely. The cause and effect of accidents were quite unrelated in magnitude. A particular cause might result in the loss of a limb, and yet on another occasion the same cause might lead only to a slight cut. But every potential accident was of importance to people like themselves who were keen to get down to the actual cause and to eliminate it.

Initial Resistance

For many years, went on Mr. Barnett, the principle of seeking the co-operation of manufacturers had been regarded as a step in the right direction, although it had not always worked out quite smoothly, and a certain measure of compulsion had had to be used. This, in turn, had been resented. For example, the compulsory fencing of certain machinery did arouse manufacturers somewhat, and round about the 1850's some of them did object very much to Government "interference," and there was formed an "Association of Factory Occupiers" in order to combat the new regulations. Some time after, his Department did begin to get some co-operation from industry, and representatives of both management and operatives eventually came into the picture. Then, when the Employers' Liability Act came into operation, a much greater measure of co-operation took place on the part of industry.

In industries where there was a Joint Industrial Council, the business of preventing accidents could be dealt with by committees of that Council. That had actually happened in the flour milling industry, the paper mills, and the printing trade, where there had been drawn up regulations governing the fencing of machinery and other related matters.

Mr. Barnett said there were far too many accidents of the "nip" type happening throughout industry, yet these were easily prevented. It might be that it would be a good thing to bring in the makers and users of the machinery in question to co-operate with his Department. That had been done in regard to power presses, and he hoped they would get down the numbers of such accidents. Other important factors in helping to prevent accidents were attention to environmental conditions, such as good ventilation, good lighting, and the avoidance of fatigue.

Fuller Discussion

The speaker referred to the building up of the Safety Officers' Groups, who were given safety courses under the auspices of RSPA. In the future they would be getting addresses variously from factory inspectors, safety officers and medical inspectors. All accidents were from carelessness on someone's part, but one had to find out the other factors leading up to them. "We have a very long way to go before we can decide that every accident is preventable, although we know that a good many of them are," said Mr. Barnett. "Some managements have still not come to regard accident prevention as an integral part of a works set-up, but it is just as important as, say, the sales department and the manufacturing department."

In many firms, continued Mr. Barnett, there was scope for the appointment of well qualified safety officers who would spend their whole time on the job, and there must be many factories where a safety committee could well be set up even though there was not the scope for a whole-time safety officer. "We must get the idea of safety into the minds of the supervisor and the foreman as well as the workman. Research workers said that there was such a thing as an accident-prone workman, and industry should therefore try to avoid giving the more dangerous jobs to such a person."

With regard to the progress of safety measures, there had been a distinct improvement in the number of fatal accidents in recent years, though there had been a rise in reportable machinery accidents in 1946, which was the last year for which complete statistics were available.

The chairman, Mr. A. G. Palmer, pointed out that the increase in the number of non-fatal accidents referred to by Mr. Barnett was probably accounted for by the greater number of people employed. In any case, success must always come from co-operation.

Dollar Aid for Greece

Priority for Some Chemical Products

FUNDS made available by the U.S.A. to Greece for reconstruction and relief purposes in the first quarter of the current year amount to $121,355,000. Expenditure has been classified under seventeen general headings and stipulations made as to whether imports are to be undertaken direct by AMAG (the American Mission for Aid to Greece—which in any case supervises all imports), by the Greek Government, or by private traders. The funds may be spent in any country.

Allocations include the following (in thousand dollars): Metals $4035 (AMAG), $180 (Greek Government), $1990 (private); drugs and medical supplies $900 (AMAG), $2050 (private); and chemicals, paints, dyes $1500 (Greek Government), $3151 (private).

NEW U.S. SILICONES

THE U.S. General Electric Company's chemical department has announced the release through commercial channels of seven standard grades of G-E silicone rubber moulding compounds. All these silicones withstand temperatures ranging from minus 70° to plus 520°F. and have exceptional electrical and chemical properties. Stocks include both moulding and extruding compounds which may be readily processed in customary production equipment.

The moulding compound requires to be premilled for about 10 minutes on cold rolls prior to moulding to secure satisfactory flow and plasticity. Moulding is performed at low pressures in standard compression or transfer moulds and the mould design should allow for about 2-3 per cent dimensional shrinkage on curing.

One of the released materials which can be pulled, broken with a quick snap, or bounced like a ball, will be used in U.S. top-grade golf balls, the first large use of this particular type of silicone. Combined with a new type of winding, the silicone centre is said to permit better flight and give improved "feel" to the ball.

U.S. European Refineries

The California Texas Oil Company's plan to expand its refinery plants in France and in the Netherlands has been put into operation. In France, the Raffinerie de Pétroles de la Gironde, located near Bordeaux, which discontinued operations in 1940, is to be modernised and expanded. The Rotterdam plant of the Caltex Petroleum Maatschappij N.V. is to be rebuilt at a cost of about $18 million.

Dutch Chemicals

From Our Amsterdam Correspondent

OWING to continuing excessive demands on the capacity of its existing contact acid plants, Sulphuric Acid, Ltd., is seeking additional capital for another plant. Increased earnings thereby expected to accrue, instead of benefiting shareholders in the form of higher dividends, will be allocated to research and development work.

* * *

The hydrogen plant of Lutterade may commence to operate by June, 1949. Nitrogen, which is to be produced at the same installation by a new process, will be manufactured at the rate of 300 tons per day, as against the current (and pre-war) rate of 170 tons per day. The ultimate production target is 200,000 tons a year, which will exceed current Dutch needs by about 50,000 tons annually. Plant and machinery belonging to the nitrogen factory of the Cie Néerlandaise de l'Azote, of Sluiskil, which was confiscated and sent to Germany during the war, has been largely recovered. Reinstallation is proceeding, and operation may begin by 1950.

* * *

Manufacturers of ammonia, chlorine, oxygen, nitrogen, compressed air, etc., are generally achieving remarkable output figures. Last year, for example, both in value and volume, production was five times greater than in 1939, and more than half went to France. Sulphuric acid is for the most part retained for home consumption. Glauber salt, glues, lacquers, varnishes, hydrochloric acid, chloride of ammonia, caustic soda, and a range of perfumes are all playing important rôles in exports. Salts of quinine and related products were exported to the extent of 389,000 metric tons compared with 645,000 metric tons in 1939. Chiefly responsible for this large reduction are the American restrictions, the unrest in Java, and the success of the synthetic material.

Australian Bauxite Deposits

According to a recent announcement by the Australian News and Information Bureau, large quantities of bauxite have been discovered at Inverell in New South Wales. The deposit may be the largest of its kind in Australia, and experts state that it is of good commercial standard. One report is that a million tons have been uncovered, mainly as a result of information supplied by residents.

Aluminium Company Sued

Alleged Contamination by Fluorine

DURING the preliminary hearing of a petition for interdict lodged against the North British Aluminium Company, Fort William, by Ben Nevis Distillery (Fort William), Ltd., in the Edinburgh Court of Session last week, the respondents claimed that should the action be successful 72 per cent of the entire output of aluminium in the United Kingdom would be suspended for a time. This, it was claimed, might result in a yearly expenditure of dollars to the value of £1,750,000.

The Distillery Company sought to prevent the manufacture of aluminium in a manner whereby noxious vapour might be caused to pass over the lands owned or occupied by the petitioners to the damage or injury of trees, shrubs, plants, stock or estates.

The North British Aluminium Company was stated to occupy and operate at Fort William a factory containing three furnace rooms with approximately 300 furnaces which are used day and night for the manufacture of aluminium by the electrolytic reduction of alumina. The petitioners complained that the fumes given off by the respondents' furnaces were not treated in any way but permitted to escape.

Effect of Fluorine

The fumes, said the petitioners, consisted partly of fluorine, and the strongest prevailing wind carried them over the whole of the petitioners' property, contaminating the vegetation in the area and causing fluorosis in animals which grazed on herbage contaminated by fluorine.

Denying that damage had been done by fumes from the factory, the respondents alleged that fluorine does not destroy vegetation and they made no admission as to the contamination by fluorosis of any stock belonging to the distillery.

Dollar Charge

A scheme for modernising the factory at a cost of about £500,000 had been drawn up and one of the principal objects was to eliminate fumes by the treatment of the exhaust air. The respondents maintained that the granting of the interdict would mean the complete closure of the factory until the new type of furnaces had been installed.

The only sources from which the lost output could be replaced would be Canada or the U.S.A., involving a very large expenditure.

The hearing of the petition had not been concluded when THE CHEMICAL AGE went to press.

Welsh Coal Reserves

NCB to Investigate Cannel Deposits

THE National Coal Board has been asked to review the prospects of mining the rich coal reserves believed to exist in the Leeswood and Treuddyn areas of Flintshire. Approach has been made by the parish councils of both districts, and although NCB officials would not promise any future developments it is understood they have agreed to investigate. Supporting the parish councils is Flintshire County Council, whose industrial report two years ago recommended that this area should be investigated.

Mr. Albert Jones, of Leeswood, said, following an interview with the officials, he thought they were not anxious to sink new shafts unless the deposits proved extensive.

Best in the World

The most promising project, said Mr. Jones, appeared to be the working of cannel coal which contained a high percentage of oil, and was regarded as the best of its kind in the world. Mr. J. T. Randles, of Treuddyn, who was also present at the interview with the NCB, said that while it was for experts to decide, most of the miners were certain that substantial coal reserves were still unworked. Leeswood and Treuddyn, he added, were once a busy industrial centre, but there was little activity there to-day.

Possibilities of a revival of mining in this part of Flintshire have been discussed for some years. Experiments were carried out from 1937 to 1939, and samples of cannel coal were found to provide 50 to 60 gallons of high-grade petrol a ton, as well as lubricating, diesel and creosote oil.

Opencast Prospects

It was later reported that on the outskirts of Mold the NCB were boring in search of outcrop coal for open-cast mining. At this southern end of the Flintshire coalfield, seams are known to outcrop in a natural sequence and collieries which operated many years ago extracted coal mostly at shallow depths. A substantial amount is believed to remain unworked. In a field at the Tyddyn, near Mold, two borings have been sunk at a depth of 120 feet. One of the bores penetrated an old mine working at 80 feet. From the results of these and other borings at various points, engineers will be able to decide whether open-cast mining is practicable. The seams of coal, states Flintshire's Industrial Report, extend from the Llong Cannel pits to the Tyddyn old pits on the lower side of the Mold-Chester main road.

PYROLYSIS OF HIGH POLYMERS

New Apparatus Developed in Rubber Research

A NEW method for investigating the composition and properties of high polymers has been developed in the United States by S. L. Madorsky and Sidney Straus, of the National Bureau of Standards, the Bureau announced last week. The development was made in connection with a programme undertaken by the Bureau for the study of the structure of natural and synthetic rubbers. The procedure consists in the thermal decomposition of the polymer under high vacuum with subsequent separation of the products into gaseous, liquid, and semi-solid fractions for analysis.

Polymeric substances—such as polystyrene, neoprene, rubber, nylon, lucite, and many others—owe their unusual strength, elasticity and plasticity in the long, chain-like structure of their molecules. Such compounds are formed in the laboratory by polymerisation, in which sometimes as many as several million individual molecules (monomers) are joined by chemical reaction. In addition there are, of course, copolymers, made up of two different types of monomers, such as GR-S synthetic rubber, which is formed by polymerisation of a mixture of styrene and butadiene.

Molecular Distillation

One of the more obvious means for obtaining information on the structure of polymers and copolymers is thermal decomposition of a sample under conditions of molecular distillation in the absence of oxygen or other reactive substances.

The term molecular distillation has been applied to that type of distillation where there is no return of escaping molecules to the evaporating surface. This is ordinarily accomplished by operating with high-boiling liquids under such high vacuum that the mean free path of the escaping molecules is of the order of the distance between the surface of the evaporating liquid and the cooled condensing surface of the still.

In these conditions, in pyrolysis the fragments into which the polymeric chain is decomposed by heat may be distilled and collected without further fragmentation due to molecular collision. From a study of the way in which the polymeric chain breaks up—as shown by the length and type of fragments formed, the relative amounts of monomeric to longer fragments, and similar data—much can be learned about the arrangement of the monomeric units in the chain and the relative strength of the chemical bonds involved. Pyrolysis also provides a means for determining optimum conditions for recovery of the component monomers from scrap polymeric substances.

High Vacuum

The apparatus developed at the National Bureau of Standards consists essentially of a double-walled cylindrical flask similar to a Dewar flask, except that the inner vessel is joined to the outer jacket by a ground-glass joint. The space between the cylinders is evacuated to a pressure of one millionth of a millimeter of mercury and is connected, by means of a side arm, to receivers for the various fractions. At the bottom of this space is a small tray on which a thin layer (25 to 50 milligrams) of the polymer is heated to between 300°-400°C. by means of platinum-wire helices encased in short lengths of glass tubing. During pyrolysis the outer wall of the flask is cooled by water flowing through spiral tubing surrounding the vessel.

Liquid air is first placed in the inner cylinder, and the temperature of the sample is then raised to the point of decomposition. All the products of pyrolysis except those which do not condense at liquid-air temperature, then collect on the inner wall, while the more volatile material is allowed to expand into a receiver. This gaseous fraction is analysed in the mass spectrometer; its weight can then be calculated from volume, pressure, and composition.

Regulated Temperature

To separate other fractions, the liquid air is removed from the central cylinder, and the temperature of this cylinder is raised in steps by the substitution of other refrigerants, such as dry ice, until room temperature is reached. This permits fractions which are volatile at temperatures between liquid-air and room temperature to distil over into liquid-fraction receivers, each of which is maintained at the temperature of liquid air. The condensate on the inner wall, volatile at the temperature of pyrolysis but not at room temperature, is obtained as one fraction by dissolving it with benzene, collected in a platinum crucible, and vaporising the benzene.

Additional fractions are provided by the semi-solid residue in the tray and the deposit, non-volatile at room temperature, which condenses on the outer wall of the evacuated space. This latter fraction, which may safely be assumed to have the same composition as the deposit on the liquid-air chamber, is not collected, but its weight is

calculated by subtraction of the weights of the other fractions from that of the sample. The gaseous and liquid fractions thus obtained are analysed in the mass spectrometer, while the semi-solid fractions are identified by other physical and chemical methods of analysis.

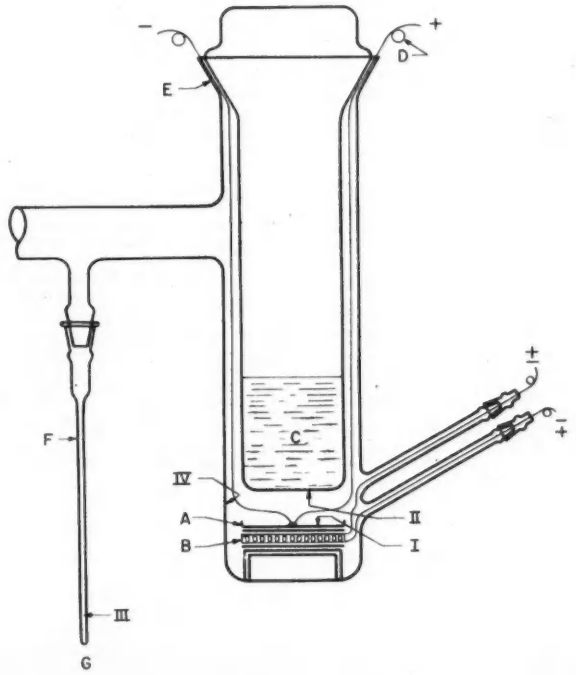
Future Studies

Because of its relatively simple structure, polystyrene was the first polymer selected for study. This compound was found to break up at the temperature of pyrolysis into the monomer, dimer, trimer, and some tetramer. The most striking observation was the consistency with which only small fragments, none longer than the tetramer, were obtained. Doubtless the larger molecular fragments became entangled in the mass of long-chain polystyrene molecules and were held until they decomposed further into shorter lengths.

The programme now under way at the Bureau includes fragmentation studies of polybutadiene, polyisoprene, natural and synthetic rubbers, nylon, and "popcorn" polystyrene. Efforts will be made to develop techniques that will provide longer-chain fragments for analysis. Plans are also in progress for carrying out similar experiments on a much larger scale with samples of several hundred grams. This will permit the collection of fractions of a size more convenient for chemical analysis and physical tests.

Long-Range Photoelectric Relay

A new photoelectric relay and light source operating on the modulated principle has been announced by the control division of the (U.S.) General Electric Company. When operated at distances up to 1000 feet, this new instrument has sufficient sensitivity to prevent false operation due to rain, fog, or snow. Applications include traffic control, counting and limiting, and protection of restricted locations. The equipment is not sensitive to changes in natural or artificial illumination.



This diagrammatic representation of the U.S. apparatus shows: (A) the tray on which the polymer is placed; (B) platinum wire heating element; (C) liquid air receptacle; (D) a platinum-rhodium thermocouple; (E) ground joint through which the sample is introduced; F & G the liquid fraction (III) remover; (H) side arm by which the more volatile fraction is conveyed to a receiver

HYDROLYSIS STUDIES OF CEMENT

Some Steps in the Quest of Standards

AS an additional factor in cement specification, it has been suggested that the hydrolysis number or index in aqueous dispersions would prove very useful. A. Rebuffat, in continuation of his earlier research with cements of Italian manufacture describes recent work in this connection. (*Chim. et Ind.*, 1948, 59, 22-29).

In 1934 he had already noted that in all cements of the Portland type the amount of ferrous iron in relation to total sesquioxide was appreciable and there were frequently traces of oxidation proceeding from the surface inwards. A certain amount of reduction with hydrogen was possible without appreciably affecting properties, and it was concluded that the iron was combined as silicate. Slag cements (clinker de laitier) did not, however, exhibit this behaviour.

First Experiments

If the iron is combined with SiO_2 it should be possible—the celite part of the cement not being hydrolysable—to recover the silicate as such in water dispersion. Either saccharified or brominated water could be used. With the latter the free lime reacts and forms hypobromite, and the dispersion separates into a residue and liquor. This residue could be washed and dried.

Neither sugar nor bromine, however, proved entirely satisfactory and the author therefore tried a new method with distilled water to which also was added some phenolphthalein. After cement powder had been added to the water and hydrolysis begun, it was neutralised by HClN/10. The amount of acid required to neutralise basic matter set free, as a percentage, is the hydrolysis number or index, for it is quite definite for any particular cement. It is independent, too, of the kind of acid used.

Temperature used in this case was 80° C. and the time required for hydrolysis was about 50 hours. The latter factor necessarily varies somewhat according to the type of cement. Some care must be given to fineness of sample which should be thoroughly ground. Table I (below) presents an analysis of various Italian cements together with hydrolysis numbers and free lime.

The silica found in the separated liquors after hydrolysis is always much less than would be required to combine all the freed lime into tricalcium, as is shown in Table II. Here the almost complete absence of alumina is of interest.

Studies of Residues

The author describes in some detail results of microscopic examination both of the original cement powders and of the sludge or residue after hydrolysis, using balsamised xylene as medium. The residue particles appear to consist of two parts: one of a brownish yellow tint and the other clear and colourless and for the most part surrounding the coloured nucleus or celite. They differ also markedly from a prepared mixture of gels of silica and alumina.

The author proposes to make spectrographic (Debye) study of the residues but meanwhile concludes that the residue or clear portion thereof is at all events of a zeolitic nature. Since this clear portion and the natural zeolites are intermediate between colloids and crystalloids it was found possible to separate the two parts of the residue (clear and coloured) by treating with a warm (40° C.) solution of caustic

TABLE I

	Portland			Pozzulanic	(de laitier) Slag	Ferrous
	I	II	III	IV	V	VI
Loss on heating	0.73	0.38	0.26	0.34	0.54	—
Silica	21.93	22.7	23.7	22.36	23.23	18.80
Alumina	5.73	5.49	5.24	3.28	5.41	6.05
Iron oxide	3.60	3.01	2.31	2.52	3.22	9.40
Lime	68.66	67.0	67.4	65.34	61.30	63.2
Magnesia	—	—	—	1.42	3.76	0.95
Sulph. trioxide	—	—	—	1.30	1.53	—
Alkali (Na_2O)	n.d.	n.d.	n.d.	2.34	n.d.	n.d.
Mn tetroxide	—	—	—	—	0.18	—
Hydrolysis No.	61.1	60.1	61.5	61.0	56.1	51.3
Freed lime	61.08	60.2	61.4	59.0	52.0	48.86

TABLE II

Per cent	I	II	III	IV	V	VI
Silica	14.89	11.5	14.23	13.47	12.6	12.8
Lime	61.08	60.2	61.4	59.0	52.0	48.86
Alumina	0.39	0.25	0.24	0	0	trace

soda (N/50 NaOH) several washings being made.

The very small fragments of quartz and silicate separate out almost entirely in the first wash; and from the point of view of dispersion the residues may be divided into three groups:—

C.A. Group. After several washes the zeolitic part is completely dispersed, while the celite remains intact and, although hydrated, is by no means colloidal. The original forms of the celite may be noted. In this celitic fraction may be found silica, iron, lime, but no alumina, while in the soda liquor are silica, alumina, and lime. This group includes the Portland and pozzulanic cements.

C.B. Group. Slag cements (clinker de laitier), which according to Dorsch, do not differ materially from Portland types. This, however, is not quite correct as microscopic examination reveals two celitic forms of differing colour, one of which disappears on hydrolysis. From the results obtained with caustic soda treatment it is concluded that the alumina is combined in at least two different structures with correspondingly different properties; this is not the case with Portland cements. It may be supposed that brownmillerite is present in slag cement.

Effect of Heat on Free Lime

Varying views have been expressed as to the hydration of brownmillerite and formation of lime compounds. The author notes that in Portlands when heated, say up to 700/750°C., the free lime increases, while in slag cements it decreases, presumably due to formation of aluminates. In Portland cements there are virtually no free aluminates.

C.C. Group. This contains cement No. VI (Ferrari) in the hydrolysed residue of which there is little or no colourless matter, and the celitic nucleus is deeply coloured. After two alkaline (soda) washes there is no further change. The celite still contains half the alumina of the original cement and always some silica.

Omitting No. I Portland, the table (III) at the foot of this page shows analyses of hydrolysed residues of the others, including initial and final for No. V, and the iron/lime ratio.

These figures are discussed in connection with the permanganate test and loss on heating which, by the way, may be replaced by a gain in weight under some conditions. In regard to No. VI, the permanganate test is at first almost negative and the celite does not appear to be hydrolysed. There is evidence of solid solution, but this type of cement appears somewhat abnormal and requires further study. In the case of No. V, the initial stage is characterised by dispersion of the zeolitic part. From the analyses it may be inferred that it is a mixture in the final stage of one part brownmillerite and three parts bicalcium ferrite.

Silica in Celites

The question whether the silica found in all celites is or is not impurity resulting from hydrolysis must be considered. The fundamental characteristic of ferrites is that they are decomposable at a sufficiently high temperature by a reducing gas. This has been known and studied for many years, using, for example, the method and apparatus of Chaudron and carbon dioxide as reducing agent. The author, however, has preferred hydrogen, with electric heating—up to 750°C.—in an apparatus capable of dealing with several samples at once.

The results are graphed and discussed in detail, showing the oxygen/iron oxide ratio. They are definite and characteristic for each type of cement. It is important to note that, after 60 hours, not only is the amount of oxygen lost much less than that of the iron oxide, but the curves tend to become asymptotic; so that a final equilibrium may be expected.

This seems to be indicated also by the fact that after a certain period, say 40 hours, the cements (clinkers) absorb oxygen (become peroxidised) at a rapid rate, probably because the iron formed by reduction is in a highly divided state.

It is concluded that the celite of commercial cements does not follow the known simple laws for bicalcium ferrite and brownmillerite, owing to its content of silica, which is not some impurity of hydrolysis but forms a definite part of the celite.

Variations in colour, though not of primary importance, are nevertheless also of interest, and their significance is briefly indicated.

In order to study the zeolitic part of the

(*Concluded overleaf*)

TABLE III

	II	III	IV	V Initial	V End	VI
Loss on heating	13.10	15.85	18.28	16.45	17.30	10.9
Silica	17.80	14.40	19.74	16.0	17.33	10.5
Iron oxide	41.0	41.50	32.15	23.2	36.88	32.57
Alumina	—	—	—	4.1	—	9.98
Magnesia...	—	—	4.10	—	—	—
Lime	25.4	26.4	23.22	28.9	26.70	33.8
Fe_2O_3 CaO ratio	1.61	1.57	1.38	1.34	1.41	0.98

Progressive Analytical Methods

Improved Detection of Arsenic and Carbon Monoxide

A NEW "electric-eye" technique for detecting and measuring traces of arsenic in metals, drugs, foods and other materials has lately been described by Mr. O. P. Case, of the American Brass Company, Waterbury, Conn., at the third annual Pittsburgh Analytical Symposium sponsored by the Pittsburgh section of the American Chemical Society. As little as 0.01 per cent of an arsenic impurity seriously impairs the ability of copper wire to conduct electricity, he said. On the other hand, arsenic is a valuable constituent of many insecticides and certain alloys, helping to prevent corrosion of copper boiler tubes and hardening lead-base metals used for shot and bearings.

Most of the methods previously employed are lengthy, tedious, and inaccurate unless the analysis is performed by an expert. The new technique is, however, described as simple, applicable to small samples, and accurate for routine analysis. Two chemical steps free the arsenic from the material and convert it to a blue-coloured compound. The colour intensity is then measured with a photoelectric colorimeter, which indicates the amount of the arsenic present.

The technique has also been applied to the analysis of tin-base and lead-base alloys and to open-hearth iron with good results. Mr. Case also thought that it could be applied successfully to the analysis of many other metallurgical products, and to other materials, including pharmaceuticals, insecticides, pigments, and foods, provided a sample containing a minimum of a ten-thousandth of a gram of arsenic is a convenient size for handling.

Procedure is as follows: the sample is treated with hypophosphorus and hydrochloric acids to liberate the arsenic in the form of a pure metallic powder, which is then redissolved and combined with a chemical containing molybdenum (molybdenum and arsenic unite to form a compound with a deep blue colour). The more arsenic the deeper the colour. None of the individual steps involved in this technique is new, but they have never before been combined.

A new method for measuring carbon monoxide when it is mixed with carbon dioxide has been reported by C. H. Toensing, of the Carnegie-Illinois Steel Company, and Dr. D. S. McKinney, of the Carnegie Institute of Technology. They have predicted that their technique will find wide application in industry, where analysis of such mixtures is often essential in the production of uniform grades of steel and other smelted metals. The method is particularly adapted to gases rich in carbon monoxide, and accurate results have been obtained in a series of 200 tests. The carbon dioxide fraction is first removed by absorption on asbestos impregnated with caustic soda, the carbon monoxide being converted to carbon dioxide, similarly removed and weighed.

New Pharmacopœia.—The General Medical Council announces that the new British Pharmacopœia will be published on September 1 next; copies will be available for inspection in advance of publication at the GMC headquarters, 44 Hallam Street, London, W.1.

HYDROLYSIS STUDIES OF CEMENT

(Continued from previous page)

residue it is necessary to evaporate the alkaline liquors, collect and dry the solid and analyse. Three groups are again distinguished:—

Z.A. Group. Portland cements, which must be studied by combining several residues. Numerous analyses confirm that the colourless fraction corresponds to the formula: $3SiO_2Al_2O_3CaO$.

Z.B. Group. Pozzulanic cements, in which analysis indicates correspondence with a similar formula to that just given, but with $4SiO_2$.

Z.C. Group. Slag cements; formula, the same, with $5SiO_2$.

The zeolites are not originally present in the cement but are formed by reaction with the water content of aluminium silicate. Some experiments relative to this phenomenon are described. The setting of cements is considered to be no more than the formation of zeolite, which proceeds differently according as the grains are in contact or apart, and generally is governed by the alumina content of the cement.

Finally, the part played by gypsum may be considered. Its effect would seem to be entirely physical. It is softer than the other constituents of the cement and in the grinding becomes extremely fine. With water it may form a coating on the other particles.

Generally, it may be concluded that the mineralogical constitution of the raw materials used is the basic factor in cement properties. In a subsequent communication the author hopes to discuss the theory required to explain the facts put forward and complete our knowledge of cement structure and reactions, as well as of physical changes.

GERMAN ACETYLENE CHEMISTRY

Wide Field of Potential Uses

THE possibilities of extended use of acetylenes in a wide productive field making use in part of the practical experiences and some original research in Germany during the war formed the subjects of an able survey by Dr. A. W. Johnson at a meeting last week of the London Section of the Oil and Colour Chemists' Association. Mr. David E. Roe (chairman of the section) presided.

Dr. Johnson said there must be few organic compounds which could compete with acetylene in versatility of reactions combined with general usefulness as a basic material for chemical industry. The latter aspect was well evidenced by the numerous reports on the German war-time chemical industry which had been compiled by the teams of Allied investigators.

It was revealed that Germany had built its industry for the manufacture of the major aliphatic organic chemicals around acetylene as the basic starting material, largely because of the shortage of molasses and petroleum reserves. But it could not be over-emphasised that, great as the German contributions to our knowledge of the chemistry of acetylene and its compounds undoubtedly were, their war-time effort was largely due to the necessity for using acetylene as the keystone of the chemical industry. That necessity did not exist in this country, and we should, therefore, accept many of the German claims with considerable reserve.

The hydrogenation of acetylene to ethylene on a scale approaching 50,000 tons per year, and the fact that the production of aromatics from acetylene was envisaged on a commercial scale, provided good examples of methods which could not be considered seriously in Britain or America today.

Production and Safeguards

Acetylene was largely produced in Germany from carbide, itself dependent on coke and lime. It was interesting that before the war the carbide production was divided equally between acetylene production, welding and the cyanamide industry, whereas during the war the acetylene allocation was increased to about 54 per cent. One plant employed the electrothermic or arc cracking of hydrocarbons, such as natural gas or coke oven gas, for acetylene production, while minor processes included the thermal cracking and oxidative cracking of methane. In countries where the cost of electricity was appreciable it was possible that the latter processes would prove to be of considerable value.

Possibly the most important single German contribution to acetylene chemistry was the successful solution to the problem of working with acetylene under pressure, and detailed instructions were now available for the operation of those pressure reactions varying from the laboratory scale to the production of butinediol on a scale approaching 50,000 tons a year. It was difficult to over-estimate the effect that that work would have on future research in this field.

Omitting a detailed account of the construction of plants and of the various precautions adopted for working with acetylene under pressure, Dr. Johnson said that two of the most important of them were to break up all large volumes, *e.g.*, by packing wide pipes with bundles of narrow tubes and the free space in autoclaves with Raschig rings, etc., and also to dilute the acetylene with an inert gas, such as nitrogen, whenever that had no appreciable effect on the reaction rate or yield.

Three Groups

The reactions of acetylene fell conveniently into three groups: (1) Polymerisation; (2) additions to the triple bond, *e.g.*, hydrogenation to ethylene and formation of vinyl compounds; (3) reactions involving the active hydrogen atoms, *e.g.*, reaction with formaldehyde to give butinediol.

The controlled polymerisation of acetylene might proceed in several ways to yield a variety of well defined and useful products. Dr. Johnson discussed some of the early work of Berthelot and Willstatter. The straight chain polymers of acetylene, he continued, had been known for a number of years, their discovery dating back to 1931, when Nieuwland and his co-workers in America had shown that on bubbling acetylene through a certain catalyst it was transformed to a mist of monovinyl acetylene and divinyl acetylene, together with small amounts of higher polymers.

The former, on reaction with HCl, was transformed into chloroprene, which might be polymerised to the valuable synthetic rubber, neoprene, which was manufactured on a very considerable scale in the United States and in Russia and had attained great importance during the war. German production of neoprene, however, was very small and the Germans seemed to regard it as a speciality product; they had concentrated their synthetic rubber programme on Buna from butadiene.

Incidentally, nothing much came of the early German attempts to hydrogenate monovinyl acetylene to produce butadiene;

later, butadiepe was prepared by other methods.

Divinyl acetylene was something of a problem child, for it had a great tendency to form explosive peroxides in contact with air; and as no very good use had been found for it, large quantities were burned. Small amounts were used in the production of drying oils and other products.

The reactions of acetylene involving additions to the triple bond included the hydration of acetylene to acetaldehyde and the production of all the important vinyl compounds. In Germany, acetaldehyde was another keystone of industry, being used largely for conversion to butadiene; but in countries which had petroleum reserves, especially America, butadiene would probably be obtained by the cracking of butenes.

In the vinyl monomer field much of the German work had been published before the war; it included the preparation and polymerisation of vinyl chloride, esters, alcohol, acetals, ethers and amines, as well as acrylonitrile, and there was little evidence that their war-time research had been any more successful than that in the Allied countries.

Some New Products

One or two novel products, however, had come out of the work. For example, although the reactions of acetylene phenols in the presence of an alkaline catalyst would yield a vinyl ether, in the presence of zinc naphthenate at elevated temperature and pressure, nuclear vinylation occurred to yield a vinyl phenol which generally polymerised spontaneously.

In one case the product was a valuable tackifier known as Koresin. In other cases, the resulting polymers, when used in dilute aqueous solution, attained considerable importance as blood plasma substitutes during the war. An unexpected reaction was the synthesis of neurine from trimethylamine by heating an aqueous solution with acetylene under pressure.

A further series of novel reactions had developed from a study of the reaction of acetylene and carbon monoxide, which gave acrylic acid. That was later expanded to a general reaction, and was operated as a batch stoichimetric process and as a continuous process for a few products.

A typical example of the type of compound in which the triple bond was preserved was the German synthesis of butinediol, which was manufactured on the scale of 30,000 tons a year, and from which many other intermediates were obtained.

Dr. Johnson did not consider that the German research had been in any way superior to the American, French, Russian or our own, but stressed that it provided an excellent example of what acetylene could be made to do in industry when necessity demanded it.

Among the more academic results he regarded as perhaps the most spectacular the recent applications of acetylenic compounds in the polymer field, with particular reference to vitamin A. At least two authentic syntheses were now available for vitamin A itself, as well as methods for the preparation of its ethers, etc.

He also discussed the work carried out by Sir Ian Heilbron and Dr. E. R. H. Jones and their colleagues on the properties of the simple acetylenic carbinols; among the reactions they had developed was the oxidation of secondary acetylenic carbinols with chromic acid to the corresponding acetylenic ketones.

His survey of the academic work that had been carried out served to indicate the very wide range of products which could be synthesised by the use of the acetylenic intermediates.

Might Yield Drying Oils

In the course of discussion, Mr. S. L. Goodchild asked what Dr. Johnson thought of the prospects of using acetylene chemistry to tailor-make drying oils, in the same way that so many other materials had been tailor-made. It seemed to him that it should be possible to build up conjugated double bonds in all sorts of systems. In particular it might be possible to eliminate oxygen and to obtain drying oils with very greatly superior water resistance. He believed divinyl acetylene was one example which was not yet a practicable drying oil; but it seemed that so much progress had been made that it should be possible to synthesise any drying oil that we wanted. Dr. Johnson agreed that it should be possible to build up long chains of conjugated systems.

Belgium-Luxembourg Iron Plan

An agreement recently concluded between Belgium and Luxembourg, provides for the iron (and hence steel) production of the two countries to be in the proportion of three to two. In addition, Luxembourg has agreed to supply one-third of its output to Belgium at prices understood to be below cost. Last year, Luxembourg supplied 40-50 per cent of her iron output to Belgium at below-cost rates, and yet still managed to report satisfactory results. This is believed to have been due to disposal of the remainder of the output at very attractive terms in other markets.

Acetylene Derivatives in Spain

Acute Inadequacy of Present Output

THE great development in recent years in the manufacture of acetylene and its many derivatives, is recorded in *ION* (January, 1948(pp. 3-6) by Dr. L. Blas. He observes that it is revealing a kingdom in organic chemistry based on the very simple synthesis of calcium carbide and thence acetylene.

Spain, despite her large potential electric power sources in her rivers and waterfalls, has not taken a very prominent part in exploiting the numerous opportunities presented. During the years 1931-5 the average annual production of calcium carbide was 23,800 tons, and as home consumption only required about 20,000 tons there was a small margin for export.

Prospective Revival

Since the Spanish civil war production has declined substantially, while demand has increased. In 1945 the output of calcium carbide was only 16,200 tons, and the price in the Spanish market was something like 970 pesetas per metric ton. It is hoped, however, that the decline in output is only temporary, and that, for 1948, the figure will reach at least 30,000 metric tons. In three years it may exceed home demand again, unless the latter is enlarged by serious attempts to develop some of the numerous acetylene derivatives.

For statistical purposes it may be accepted that a ton of carbide requires some 4000 kWh of electrical energy; and further, that a kilo of acetylene requires 13 kWh. From this kilo may be obtained 2.3 kilos of acetic acid, or 3.4 kilos of oxalic acid, or 5 kilos of trichlorethylene.

The author summarises some of the more outstanding developments in acetylene chemistry, beginning with chlorination and the production of the tetrachloride and trichlorethylene, both of which are manufactured to some extent in Spain, the latter being used as solvent for oil and fat recovery, *e.g.*, grapeseed oil. The pentachloride and hexachlorethane are also made in Spain, and it is said that enormous quantities were used in the last war as fumigant. Some interest is being taken in Spanish chemical circles in the production of other chlorinated acetylene derivatives.

Other derivatives are briefly noted under the heads of hydration, linear polymerisation, esterification and other condensations, reduction, oxidation, and benzol polymerisation. Relatively little is recorded about Spanish achievement in those fields; it is noted in connection with hydration that a Spanish firm obtained permission just after the civil war to erect a plant for manufacture of acetaldehyde, etc., but nothing further was heard of it. The author also thinks it inexplicable that practically nothing appears to have been done in his country in connection with hydration and decarboxylation for production of acetone; nor for production of acetic anhydride by esterification.

Finally, the manufacture of benzene by polymerisation should be of special interest to the country like Spain which is lacking in materials such as petroleum to serve as a basis for aromatic organics. Mainly from coal distillation, some 6 million litres of benzene were produced in 1935, and this rose to 7.7 million in 1942, but Blas considers these figures absurdly inadequate in view of the fact that ten times that quantity could be used as solvent and in other ways in different industries.

Rust Prevention

U.S. "Cathodic-Protection" Device

A MAGNESIUM rod may be the answer to the perennial problem, the rusting hot water tank, according to research workers of the Dow Chemical Company, Midland, Michigan, who have recently completed extensive tests in the application of what is known as "cathodic protection" for domestic water heaters. When introduced into the tank by means of a special fitting, the magnesium rod (technically an anode) becomes self-sacrificing, and disintegrates in place of the tank walls.

The anodes are made from small-diameter magnesium rods of special alloy and contain a core of steel wire to prevent breaking up of the anode at points where concentrated attack takes place. Easily installed, they may be used on any size or type of water heater. In existing heaters, the rod is adapted for convenient installation through the hot water outlet, without affecting hot water draw-off.

A rod extending the full length of the tank, has a six-year life, though it may need replacement at an earlier or later time, depending upon the characteristics of the water. Tests over a wide area and range of water types have proved the anode's value to U.S. tank manufacturers, and several are already including them in their latest models.

MICRO-ORGANISMS AND ADHESIVES

Comparison of Synthetic and Natural Glues

THE susceptibility of animal and vegetable glues to attacks by micro-organisms has led to the increasing use of synthetic resin adhesives by manufacturers whose products are reaching new tropical markets, where extreme humidity has a marked effect upon glued joints of all kinds.

Synthetic resin adhesives, as is well known, provide a water-resistant glue line immune from decomposition by moulds and bacteria. In the February bulletin of the Technical Service Department, Aero Research, Ltd., extracts are given of reports on the weathering qualities of glues carried out by The Forest Products Research Laboratory, Princes Risborough, and the United States Department of Agriculture.

Growth of Bacteria

In one experiment, dealing with the effects of moulds and bacteria on plywood, nine different commercial brands of casein glues were cultured by placing small quantities of the glue powder in hanging drops of sterile water on sterile slides and by scattering the glue powder over the surface of an agar medium containing one per cent casein glue powder and two per cent malt.

The report states: "A considerable variety of bacteria and yeasts developed in all of these cultures within 24 hours. The same kinds, in general, were present in all of the nine glues. Relatively few species of moulds were found in any of the glues, although *Penicillium brevicaule*, which appears to be one of the principal causes of delamination of plywood glued with casein glues, was isolated from five of the nine different glues."

Another experiment to determine whether organisms in glue powder were able to survive in the glue line, revealed that many of the bacteria are killed in the actual gluing process, probably by the high alkalinity of the glue.

"Nevertheless," the report continues, "one or more kinds of bacteria not only survive in considerable numbers in plywood but also continue to grow if the wood is wet enough. This was apparent when examining some of the surface-disinfected specimens to which no organisms had been added, either in the gluing operation or afterwards. After two weeks in the jars, masses of bacteria began oozing from the glue lines of those glued with both the casein and the soyabean glue. The bacteria appeared identical with those isolated from nine different casein glues, from soyabean meal, and from the plywood made up with these glues. Delamination followed in one to three weeks when these bacteria were innoculated on surface-disinfected specimens having 50 to 65 per cent moisture content."

Long-term weathering tests on plywood panels, with special attention to the resistance of plywood joints to moisture and attack by micro-organisms were also carried out by scientists of the Forest Products Research Laboratory. Nearly fifty adhesives were used in the experiments.

Plywood was fixed on walls, buried in earth and soaked in water during the tests and it was found generally possible to distinguish between the effects of moisture as such and the effects of micro-organisms upon adhesives.

While unextended synthetic resins offer excellent resistance both to conditions of extreme humidity (including prolonged immersion in water), and to micro-organisms, some adhesives are successful in one only of these two classifications. Blood albumin, for example, is highly water-resistant but cannot withstand the attacks of micro-organisms. Casein joints, weakened by prolonged immersion in water normally regain their strength when dry, but they likewise offer no resistance to micro-organisms.

Conclusions

Summarised, the tests indicate that adhesives unaffected by attack from micro-organisms are phenolic resin glues, of the film or liquid type, whether hot or cold-setting, and all types of urea resin glues, either neat or not containing more than 33 per cent of flour.

Urea resins, extended with more than 50 per cent of flour, and all types of casein glues were found susceptible to the ravages of micro-organisms.

It is not possible to give an arbitrary figure for the percentage of organic extender which may be safely used with a synthetic resin adhesive commensurate with immunity from micro-organism attacks. As a general guide, a proportion exceeding 25 per cent renders the glue progressively more susceptible to such attacks, and additions of various toxic substances have so far been found to have made no noticeable improvement in resistance.

U.S. Copper Stocks.—Stocks of refined copper in the U.S.A. fell to 70,146 tons in February—a drop of 1387 tons—says the U.S. Copper Institute.

American Chemical Notebook

From Our New York Correspondent

ACTING under the powers of the Anti-Inflation Act, which authorises Government agencies to seek co-operation from industry in setting up voluntary agreements to allocate scarce materials in time of grave shortages, the U.S. Department of Commerce last week invited the chemical industry to participate in such a programme by sending representatives to Washington to discuss production and distribution problems. The invitation is the fourth, the others having been sent to cast-iron, soil and pressure pipe manufacturers, and plywood industries. The meeting for the chemical industry was intended to take place on Thursday this week.

* * *

Continuing advances in the costs of raw materials, production and shipping were set forth as primary reasons by the Du Pont Company in a move last week that raised its prices for methanol and formaldehyde. The former has been increased by 4c. a gallon, and the latter by ¼c. per lb., both effective from April 1. The new price for formaldehyde, 4.2c. per lb. for regular grade, is approximately at the pre-war level, while that for methanol, 28c. per gallon in tank cars, compares with a price range from 30-32c. in 1940. The increased cost of formaldehyde also has necessitated an increase of 1.5c. per lb., from 26 to 27.5c., of hexamethylene tetramine, technical grade, and an increase of 1c. a lb., from 25 to 26c. for paraformaldehyde.

* * *

Plans for constructing an oxygen-filling station and acetylene plant at Billings, Montana, are now being completed by the Linde Air Products Co., a unit of the Union Carbide & Carbon Corporation. The company has announced that operations will begin shortly. The plant will provide industries in the area with Linde oxygen and Prest-O-Lite acetylene.

* * *

A new firm, R. S. Aries & Associates, 26 Court Street, Brooklyn, New York, has been formed by Robert S. Aries, consulting chemical engineer, with the idea of offering a new type of engineering service designed to eliminate much of the lag between technological advances and the marketing of new products. The new firm will service the chemical process industries on new product development, technical and economical surveys, market research, industry studies, plant and process evaluations and statistical analysis. Joining with Dr. Aries in the new venture will be specialists in pulp and paper manufacture, petroleum chemicals, resins and plastics, fermentation, synthetic organic chemicals, wood waste utilisation and economics, foods and amino acids.

* * *

The Manufacturing Chemists' Association has released Chemical Safety Data Sheet SD-20 on Sulphuric Acid, the twentieth in its series of chemical product safety manuals designed for supervisory staffs and management. As in previous manuals, there are set forth important physical and chemical properties, shipping and storage and handling procedures, and recommendations for personal protective equipment. Health hazards and their control are covered authoritatively in a special section prepared by the Medical Advisory Committee of qualified physicians and toxicologists. Copies may be purchased at 20 cents each from the Manufacturing Chemists' Association, 608 Woodward Building, Washington 5, D.C.

* * *

A new photo-electric recording wattmeter designed for such applications as analysing welding circuits and measuring industrial heating load, motor-starting load, and power surge, has been announced by the meter and instruments divisions of the (U.S.) General Electric Company. Consisting of a high-speed photo-electric recorder, and a newly designed wattmeter measuring unit, the new instrument can be used to measure D.C. or A.C. power up to 10,000 cycles per second. The wattmeter has a linear scale, and is available for portable use or for semi-flush mounting. Chart speeds of one half-inch per hour up to 72 inches per minute can be obtained by using different combinations of chart carriages and rate gears. When the instrument is calibrated for a particular frequency, accuracy is plus or minus 3 per cent. When calibrated for 60 cycles, it can be used over the entire range of from 60 to 10,000 cycles at unity power factor with an error of plus or minus 5 per cent. The power-factor error when going from 0.5 lagging to 0.5 leading is only plus or minus 3 per cent.

* * *

According to an announcement made in New York last week, arrangements have been completed between the Chamber of Commerce of the city of Pforzheim, Germany, and Frederick W. Richmond, president of the United States Foreign Corpora-

(*Continued overleaf.*)

Rapid Determination of Sulphate

Russian Photo-electric Titration Method

FOR process control of sulphate content of extracts obtained in the manufacture of phosphoric acid from natural phosphates and sulphuric acid, a rapid method of determining sulphate is essential. Here, the sulphate content may vary between a few tenths of 1 per cent and several per cent, and it is desirable that no preliminary separations should be needed. Methods of rapidly determining sulphate by photo-electric titration have been described by the Russian workers M. L. Chepelevetsky, S. S. Rubinova and B. B. Evzlina (*Zavod. Lab.*, 1945, *11*, 783-787).

Direct titrations with barium salts in the presence of an indicator are applicable only to neutral or weakly acidic solutions. When the solution contains phosphates, the latter are precipitated with the barium sulphate and render the method useless.

The following method is based on titration with barium sulphate in acid solution and photo-electric indication of the point of maximum turbidity. It is claimed that it is simpler and quicker than gravimetric methods, and that it is actually more accurate in practice, since the latter tend to give results that are too high by about 5 parts per 100.

The method calls for the use of 5 to 10 ml. of a solution with an SO_3 content of less than 1 per cent, 3 ml. with 1 to 2 per cent, and 1 to 2 ml. with 2 to 5 per cent SO_3. These are placed in the cell of a photocolorimeter, 3 ml. of 3 per cent hydrochloric acid solution are added, and sufficient water to give a total volume of 75 ml. The solution is stirred mechanically, and from a semi-micro burette is run in more than half of the volume of 0.25 or 0.1 N barium chloride solution required for complete precipitation.

A compensating colour filter is chosen to give a reading in the first 20 divisions of the logarithmic sector, and the solution is continually added from the burette in 0.2 to 0.3 ml. portions. After each addition, 1 to 1.5 minutes is allowed to elapse and the illumination of the second photo-element is compensated by means of the logarithmic sector to equalise the photo-currents, and record simultaneously the sector and burette readings.

On graph paper is drawn the part of the titration curve in the neighbourhood of the end-point. The number of ml. of barium chloride solution required for precipitation of the sulphate is read from the graph. If results are required as per cent by weight, either the specific gravity of the sample is determined or a known weight instead of a volume is taken.

In the absence of phosphoric acid, titration curves show a well-pronounced maximum at the end-point, and a further but much less definite maximum when the addition of barium chloride is continued until there is an excess of 12 to 18 per cent. The presence of phosphoric acid suppresses these maxima and the curve is then a steeply rising line prior to the equivalence point and a horizontal line after, with the intermediate portion curved. The intersection of the linear portions gives the end-point.

U.S. CHEMICAL NOTEBOOK

(*Continued from previous page*)

tion, 761 Fifth Avenue, New York, whereby the firm will import the entire output of five manufacturing plants operating in the German city. Under the terms of the arrangement, the American company will ship the necessary raw materials, including brass, copper and other metals to Pforzheim, together with food and clothing for the workers, and then bring to the United States precision machinery and partially fabricated jewellery made in the German city's plants. Prior to the war, Pforzheim was responsible for export shipments of the largest dollar value of any German city; to-day 90 per cent of the city is in ruins.

* * *

A new hypothesis to explain how at least part of the world's petroleum was created has been advanced by Dr. Claude E. Zobell, of the University of California's Scripps Institution of Oceanography. Writing in the bulletin of the American Association of Petroleum Geologists, Dr. Zobell admits that the great bulk of petroleum hydrocarbons probably resulted from the decomposition and transformation of organic matter, such as trees, ferns, and fish. But, he says, the possibility also exists that some petroleum hydrocarbons were "manufactured" by various kinds of hydrogen-oxidising bacteria in conjunction with alpha radiation of hydrogen compounds and other chemical processes. Many of these bacteria have been found in mud at the bottom of the sea in oil-bearing sands. Dr. Zobell postulates that such bacteria not only may participate in the origin of oil, but may also account for the porosity of limestone and the general absence of hydrogen in natural gas.

AUSTRIAN CHEMICAL INDUSTRY

Plans for its Rehabilitation

ALTHOUGH Austria has no substantial chemical industry, she should and could have one. After 1918, the country was in a position similar to that existing to-day. The chemical industry of the Monarchy—states a review by an expert in *Die Presse*, Vienna—remained essentially in the Succession States, though Austria still possessed a few works such as Waagemann-Seybel in Liesing, and a small number of unwieldy war factories such as the explosive works at Blumau and the high explosive plants at Moosbierbaum. She also retained sufficient capital to permit useful development.

The new position called for private initiative to counteract the existing bottlenecks of scarce foreign exchange and lack of industrial planning for mass production. Only the Skoda-Wetzler A.G. succeeded to any marked extent in solving these problems. It sold the equipment of the explosives factory to Poland and turned to the manufacture of superphosphate, and concentrated on supplying hydrochloric acid for the iron industry, sodium sulphate for the glass industry, sodium sulphide for the leather industry, aluminium sulphate for paper manufacture, copper sulphate for vine growing, etc., and thus had become an important chemical concern by the outbreak of the second world war.

Replacing Pyrites

Austria as a poor country should now concentrate on using indigenous raw materials instead of having to rely on imports.

Owing to the inadequacy of home deposits of pyrites, production of sulphuric acid was always dependent on foreign supplies. The late Professor W. J. Müller, of the Technical High School of Vienna, invented the so-called gypsum sulphuric acid process, which uses water-free gypsum as raw material. During the course of World War II, this process was applied to a large German plant which has since been dismantled as reparations. The process bears a resemblance to that of cement, which, in fact, is a by-product. Austria has 15 to 20 rich gypsum (and associated anhydrite) deposits scattered all over the country. While up to the present, the gypsum has been utilised, and the anhydrite rejected as waste, the utilisation of the latter would save yearly about a million gold schillings in the import of pyrites, and since Austria has a considerable cement industry, the aggregates for this process would be of great value for the building industry.

Similar is the situation of phosphorus fertilisers, for which the raw material—phosphate—is rather scarce in Austria. Raw phosphate is insoluble and without value in the soil. A primitive moistening with sulphuric acid makes it soluble and transforms it into commercial superphosphate suitable for plant food. The denotation superphosphate, however, is a misnomer, since it is the most primitive and poorest phosphorus fertiliser obtainable; its only advantage is its easy production.

Most Fruitful Process

In addition to this wet disintegration process, there is a dry method which consists of mixing raw phosphate with coke and heating it in an electric furnace. In this manner is obtained elementary phosphorus which can be used for a number of useful purposes. With steam and water, for instance, it gives pure phosphoric acid for food processing and a number of other industrial purposes. It can also be used in some processes as a substitute for sulphuric acid. A by-product is hydrogen—which can be used for the production of ammonia, benzene or formaldehyde. Pure nitrogen can also be obtained. Even the slags of the furnace process represent valuable by-products and can be used for building purposes. Phosphorus together with chlorine is used to produce phosphorus pentachloride for fodder conservation.

During the rapid development of the world's heavy chemical industry, Austria made but little progress in mass production, and possessed but few metallurgical plants because coal and metal ores were lacking. In the meantime, coal was replaced by electric current, leading to modern electrochemical processes to work up poor ores. Thus, Austria as a country of abundant waterpower and poor in rich ores, but rich in poor ones, was able to become only partly self-supporting in metals. New experiments started ten years ago and conducted in secrecy under war conditions, could be regarded as the invasion of exact chemical methods into the world of the metallurgist. The new processes apply circulating cold-fluid metal mixtures, a method that might be named "cold-metallurgy." Being electrochemical processes they are especially suitable for Austria.

The entire new industrial programme on such a large scale as is now contemplated will have to reckon with great psychological difficulties, but with financial support from an understanding Government, it may succeed.

D

Home News Items

Chemical Prices in February.—The price index figure for chemicals and oils in February (average for 1930=100) says the *Board of Trade Journal*, was 188.4. In February, 1947 the figure was 164.6.

Chemical Fire.—A fire broke out in the condensers of the phthalic anhydride plant at I.C.I., Ltd. (Dyestuffs Division) at Huddersfield early on Saturday morning March 20. The works fire brigade and the Huddersfield NFS gained control of the blaze before serious damage was done.

Textile Institute Conference.—Mr. Harold Wilson, President of the Board of Trade, has accepted an invitation to attend the Textile Institute's annual conference—to be held this year at Buxton from Wednesday, June 2, to Saturday, June 5—which will discuss "The Organisation of the Textile Industry and Textile Production." Mr. Wilson is expected to open the conference on June 2.

Tyre Tread Resistance.—In the course of a lecture to the Birmingham University Chemical Engineering Society, Dr. D. Parkinson, of Fort Dunlop's research department, stated that carbon black increases by 400 per cent the resistance of tyre treads to wear, due to the exceedingly small size of the carbon particles. Next to rubber itself, carbon black was the most widely used material in the rubber industry, more than 500,000 tons being consumed annually.

Disposal of Cyanogen Chloride Bombs.—At an inquiry held last week by an inspector of the Ministry of Town and Country Planning (THE CHEMICAL AGE, March 20), South Westmorland Council withdrew its objection to the storage by I.C.I. of 11,000 bomb cylinders, containing cyanogen chloride, at Holme Park Fell. Objections are still lodged by the Council for the Preservation of Rural England, the Friends of the Lake District, Holme Parish Council, and local residents.

Conference on Liquid Fuels.—The Institute of Petroleum and the Institute of Fuel are to hold a joint conference on "Modern Applications of Liquid Fuels" at Birmingham University from September 21-23, together with an exhibition of items related to the subjects on the programme. The uses of fuel oil in the steel, metal and glass and ceramic industries will be dealt with in separate sessions. Full details will shortly be circulated to members of both Institutes, while inquiries, which will be welcomed from others interested, should be addressed to the Secretary, The Institute of Fuel, 18 Devonshire Street, W.1.

Pharmacists at Glaxo Laboratories.—A party of members of the West Kent branch of the Pharmaceutical Society toured the Glaxo Laboratories at Greenford on Wednesday last week.

Plastic Protection.—A valuable jig-borer, recently consigned to Glasgow from Birmingham, made the journey in a specially designed perspex pack affording protection against wet weather during transit. This represents one of the first uses of this material for individual packs to protect industrial articles of high value.

Reduced Hours for Cokemen.—At a meeting in London last week of representatives of the National Coal Board and the National Union of Mineworkers, tentative agreement was reached on the claim for reduced working hours for men employed at coke and by-product plants. The original claim was for a reduction of working hours from 48 to 42 per week.

Lost Time.—One hundred and seventy-three industrial disputes involving the loss of 82,000 working days occurred in January this year, reports the *Ministry of Labour Gazette*. Seven other earlier stoppages were still in progress at the beginning of the year and the total number of workers affected in the 180 disputes totalled 32,600. The total number of working days lost in January 1947 was 412,000.

Localised Exploitation of Peat.—High cost of peat transport is reported to be one factor which will require that any development of peat as a raw material for chemical production must be undertaken on the site of collection. The North of Scotland Hydro-Electric Board is to investigate the creation of power substations using peat as a fuel, on islands and in areas where water power is not available. Chemical production, as a by-product is being investigated.

Returning to Stratford.—The accounts department of A. Boake, Roberts & Co., Ltd., which was evacuated to Buckhurst Hill, Essex, in 1940, is returning to the company's works at Carpenters Road, Stratford, London, E.15, on April 3. After that date all communications about customer's accounts, credits, suppliers' accounts and invoices and all remittances should be sent to Stratford (telephone: MARyland 5511). The Shipping Department will return to Stratford on April 10. The ABRAC Sales Department will continue to work from "Ellerslie," Buckhurst Hill, Essex (BUCkhurst 1133), where all inquiries about products, deliveries and all orders should be sent.

Technical Publications

THE wide and steadily increasing use of aluminium and its alloys in the food industry during and immediately preceding the war years, is a subject which though deserving of thorough investigation by firms engaged in the manufacture of plant, equipment, and containers for the food industry, has received somewhat scant treatment in published works. This omission has now been remedied by the DSIR Special Report No. 50 on Food Investigation entitled "Aluminium and Aluminium Alloys in the Food Industry," HMSO 3s. Its author is Dr. J. M. Bryan, and its contents are based principally upon the results of experiments on corrosion by acids, alkalis, water, food products, etc., and methods of protection, carried out at the Low Temperature Research Station, Cambridge, over a number of years.

* * *

Further useful contributions to technical literature are contained in "Philips Technical Review," Vol. 9, No. 7. Of particular interest is "An Experimental Electron Microscope for 400 kV," an instrument which was the subject of an initial article in the previous (No. 6) issue of the Review. The article provides a very detailed study with graphs, line and half-tone illustrations. Other papers in the same issue deal with "A Cathode-Ray Oscilloscope," "Testing for Nyctalopia," and "Applications of Luminescent Substances."

* * *

A new catalogue of technical books has just been issued by the Chemical Publishing Co., Inc., 26 Court Street, Brooklyn 2, N.Y. This includes the latest books on chemistry, physics, science, technology, petroleum, medicine, foods, formularies, drugs and cosmetics, engineering, metals, technical dictionaries, building construction, etc. It gives the date of publication of each book as well as price, number of pages, detailed descriptions and full table of contents.

* * *

With accustomed excellence of printing and photographic reproduction, "Sulzer Technical Review," No. 3/4, presents a number of interesting articles of value to scientists in many fields. Subjects covered include "Micro-hardness Testing," "Application of Electrical Energy to the Investigation of Cascades," "Determination of Rock Elasticity," and "Speed Fluctuations in Reciprocating Engines."

* * *

Advantages in using rod mills in certain grinding applications and their construction, are explained in a 12-page bulletin issued by Allis-Chalmers, Milwaukee, Wisconsin, the world's largest manufacturer of rock and ore reduction machinery. It describes the company's six types of rod mills as well as three kinds of rod mill drives. Four types of liners are available. Attention is called to the company's basic industries research and testing laboratory which is equipped to perform precision test work on all types of grinding problems. Included is a table of rod mill sizes and capacities, and the approximate overall dimensions of Texrope-driven and direct-connected rod mills. Copies of the bulletin (No. 07B6718) are available from Allis-Chalmers Mfg. Co., Milwaukee 1, Wisc.

* * *

A newly-revised bulletin, issued by Leeds & Northrup Company, 4934 Stenton Avenue, Philadelphia 44, Penn., features equipment which is said to enable refinery operators to "see" the *p*H of dehydrator water by glancing at the indicating scale of a Micromax recorder. An operator can then regulate the flow of ammonia or caustic for correct neutralisation in the tower or, by examining the chart record drawn by the recorder, he can see the trend of *p*H during the past hour, day or week. This publication describes and illustrates the L & N glass electrode assembly which constantly detects the *p*H of a continuously-flowing sample of water, while the Micromax recorder indicates and records the result.

* * *

The addition of "Monolite" Fast Red LFS to the range of pigment dyestuffs produced by Imperial Chemical Industries, Ltd., is the subject of Pamphlet S.C.507. The new product possesses good fastness to light, heat, acids, and alkalis, and will interest manufacturers of printing inks, paints and distempers.

Auxiliary Power Still Needed

The Minister of Fuel and Power emphasises that although staggering of hours is to end on March 29 it will still be necessary to give all possible relief to the electricity grid. Industrial and other undertakings using auxiliary power installations to relieve the load during peak hours are asked to continue using them at least until the end of April. Although it was made a condition when some of this plant was supplied that it was to be kept in continuous use, it has been agreed that this condition will not be enforced from the end of April to the beginning of October.

PERSONAL

MR. REGINALD DOUGLAS BARNETT CLAYTON, of Bredons Hardwick, Worcestershire, a director of the Cannon Iron Foundries, Ltd., Deepfields, near Bilston, left £91,838.

MR. HENRY J. ROSS has been appointed chairman of the Distillers Co., Ltd. He was appointed deputy chairman last August, and is a director of several other companies, including United Molasses Co., Ltd.

PROF. E. D. HUGHES, professor of chemistry at the University College of North Wales, Bangor, has been appointed to the London University chair of chemistry, tenable at University College as from October 1.

PROF. RICHARD WHIDDINGTON, head of the Physics Department, Leeds University, has resigned his editorship of the Proceedings of the Scientific Section of the Leeds Philosophical and Literary Society after 23 years' service. His successor in office is DR. R. D. PRESTON, of the Botany Department.

After being detained by the U.S. authorities on Ellis Island, when she arrived in New York on a 15-day lecture tour, MME. JOLIOT-CURIE, the French scientist, was released last week upon the instructions of the U.S. Attorney General. She was allowed to proceed using a visitor's visa, on her own recognisance, for the duration of the tour.

ALDERMAN E. O. GLOVER, of The Bent, Overton, Frodsham, who has been elected chairman of Cheshire County Council, was formerly works manager and later director of Castner Kellner at Runcorn, since merged in the Brunner Mond group, and now part of I.C.I. He was a director of the I.C.I. general chemical group until 1939.

DR. E. TALBOT PARIS, 59-year-old radar and electronics expert, has been appointed to the newly-created post of scientific adviser to Mr. Chuter Ede at the Home Office. His work will include liaison between planning departments concerned with atomic civil defence and scientists working on Army and Air Force research in the Supply Ministry.

MR. S. J. RALPH, manager of the A.P.V. chemical engineering department, has retired after 30 years' service with the company. The department was largely built up by Mr. Ralph whose wide knowledge and practical approach to the technical aspects of the industry, won and retained the confidence of all with whom he came into contact. His friends will wish him every happiness in his retirement. He has been succeeded by MR. G. A. DUMMETT, who was manager of the A.P.V. laboratories.

MR. DAVID J. GARRETT, former director of the Scottish Iron and Steel Co., Ltd., has died in a Glasgow nursing home. A native of Coatbridge, where he lived for 84 years, Mr. Garrett gained his early experience with the Waverley Iron and Steel Co., Ltd., of which he was managing director when it was amalgamated with other wrought iron firms in the West of Scotland, under the title of the Scottish Iron and Steel Co., Ltd. He was 88.

Sir Graham Cunningham

As a result of the inadvertent combination of two news items (p. 406 last week) certain public offices were attributed to the late Sir Nigel Campbell which are in fact occupied by Sir Graham Cunningham. Sir Graham is chairman and managing director of Triplex Safety Glass Co., Ltd., and is chairman of the committee officially appointed to study iron scrap and pig-iron supplies. During the war he was controller-general of munitions production at the Ministry of Supply and he is a Crown governor of the Imperial College of Science and Technology.

Obituary

The death was reported, in Westminster Hospital this week, of MR. WILLIAM STEPHEN MILNE, B.Sc., A.R.I.C., M.I.Chem.E.

Sulphite Pulp

Paper Chief Criticises Govt. Buying

IN the course of his address to the annual ordinary general meeting of the Bowater Paper Corporation in London, Sir Eric V. Bowater, chairman, deprecated the continuance of bulk purchasing by the Government of the paper industry's raw materials. Recalling his own company's wide and intimate experience of buying in that field Sir Eric Bowater said: "I have no hesitation in saying that the prices now being paid for strong sulphite pulp and, in particular, for groundwood pulp are substantially in excess of what would appear to be warranted by the cost of production thereof in the respective producing countries. Furthermore, the quantities of those raw materials that have been purchased by the Government fall short of what could, in my belief, be acquired if the Government's purchasing agents were allowed greater freedom. I suggest that the time is arriving when the paper industry should again become responsible for its own purchases.

Overseas News Items

Barytes in Czechoslovakia.—A deposit of barytes is reported to have been discovered recently near Banska Bystrica in Slovakia.

Russian Potash for U.S.A.—A small shipment from Russia (about 2000 tons) of potash was recently received in the U.S.A. This delivery was the first since 1946.

Anhydrite for Building Purposes.—Large-scale production of anhydrite, which is proving of valuable assistance in the German building trade, is shortly to begin at Nordhausen in Thuringia.

U.S. Aid for Afghanistan.—Development of the mineral resources of Afghanistan, said to include petroleum, coal, iron, manganese, copper and chrome deposits, is likely to result if the Washington Export-Import Bank grants the required credit of $100 million.

Work Begins on Gorky Dam.—A Moscow report states that work has begun on a large new hydro-electric power station near Gorky, on the river Volga. It will be twice as big as the Dneiper installation and the dam itself will be nearly seven miles long.

Fertiliser Production—Western Germany.—Production of chemical fertiliser in the British/U.S. zone is expected to reach about 900,000 tons this year, as against 750,000 tons last year. In addition, 25,000 tons per month are to be imported by the U.K. and the U.S.A., and certain quantities will come from Austria.

Benelux Chemicals for Norway.—Norway will import chemicals, iron, steel and glassware from Belgium and Luxembourg under a recent trade pact signed with those countries. In return, Norway will provide quantities of home-produced goods, including cellulose. The annual turnover in both directions amounts to £6 million.

Australian Uranium.—An intensive search for uranium and thorium is being undertaken in Australia by the Commonwealth Bureau of Minerals in co-operation with the various State Governments. So far only small deposits of radio-active minerals have been found in the Marble Bar district of Western Australia, but the Bureau is hopeful of discovering large quantities when the geological surveys have been completed.

Insulin From Whales.—Norwegian and Swedish scientists are co-operating in experiments to produce insulin from the pancreas gland of whales. If these experiments prove to be successful, insulin could become an important Norwegian export. Norway is already producing vitamin A concentrate from whale liver and about £150,000 worth is being exported every year, mainly for use in the manufacture of margarine.

Next Week's Events

WEDNESDAY, MARCH 31

Society of Chemical Industry (Liverpool Section). The Old Academy, Warrington, 7.0 p.m. E. T. Williams: "Washing Action of Soap."

Royal Institute of Chemistry (Birmingham and Midlands Section). The University, Edmund Street, Birmingham, 7.0 p.m. Annual General Meeting.

THURSDAY, APRIL 1

Royal Institute of Chemistry (London and S.E. Counties Section). Public Library Lecture Hall, Luton, 7.30 p.m. W. A. Damon: "A Day in the Life of an Alkali Inspector." (Tees-side Section) Wm. Newton School, Norton, Stockton-on-Tees, 7.30 p.m. R. Whytlaw-Gray: "The Compressibilities of Gases at Low Pressures."

Royal Statistical Society (Sheffield Group). Room B1, Department of Mechanical Engineering, The University, St. George's Square, Sheffield, 6.30 p.m. G. Komlosy: "The Application of Statistical Quality Control to a Steel Strip Mill."

FRIDAY, APRIL 2

Society of Public Analysts (Physical Methods Group). English Theatre, Mason's College, Birmingham, 6.30 p.m. Symposium on the Analysis of Radio-active and Stable Tracer Elements."

Society of Chemical Industry (Manchester Section). Engineers' Club, Albert Square, Manchester, 6.0 p.m. Annual General Meeting. 6.30 p.m. Reading of short papers.

Royal Statistical Society. E.L.M.A. Lighting Service Bureau, 2 Savoy Hill, W.C.2, 6.0 p.m. Dr. H. O. Hartley: "Some Short Cuts in Statistical Calculations."

NYLON PROTECTIVE GLOVES

THE development of new types of protective gloves for handling toxic chemicals, particularly tetra-ethyl-lead and the ethylene halides, has recently engaged the attention of two U.S. chemists, George Calingaert and Hymin Shapiro, of the Ethyl Corporation, Detroit.

In the course of their investigations, a considerable number of plastics and elastomers were tested for permeability. The neoprene/nylon mixtures stood up best to extensive tests, proportions of .5 to 1.0 per cent nylon giving the most suitable results.

German and Japanese Technical Reports

THE latest reports on German and Japanese industry, now obtainable from H.M. Stationery Office at the prices quoted, include the following of interest to our readers:

BIOS 116 (Supplement). Interrogation of Prof. Schaumann on N-(Y : Y-diphenylpropyl) piperidine, "Aspasan," and analgesic testing (1s. 6d.).

BIOS 985. The separation of methane and ethylene from coal gas (3s.).

BIOS 1595. German fluorine and fluoride industry (25s.).

BIOS 1047. German acetylene chemical industry. Generation of acetylene from carbide (6s.).

BIOS 1601. The design of industrial furnaces in Germany (British zone) (17s. 6d.).

BIOS 1620. German alkaline accumulator industry and miners' lamps using alkaline accumulators (4s. 6d.).

BIOS 1644. Manufacture of sulphuric acid, Chemische Fabrik Wesseling A.G., Wesseling Bei Koln (2s.).

BIOS 1653. German oil burning devices industry (4s.).

BIOS 1697. Synthetic oil production in Germany. Interrogation of Dr. Butefish (3s.).

BIOS 1700. The manufacture of glycerophosphates and hypophosphites in Germany (3s. 6d.).

BIOS 1702. The manufacture of carbon bisulphide in Germany with notes on sulphur recovery and thio-urea (4s. 6d.).

BIOS 1703. Manufacture of aluminium at I.G. Farben Factory, Bitterfeld (2s.).

BIOS 1706. Polymerisation of ethylene in Germany: with special reference to high pressure design and techniques (5s. 6d.).

BIOS 1708. Production of butane—1 : 2 : 4-triol at I.G. Ludwigshafen (4s. 6d.).

BIOS 1710. Manufacture of tube turns and fittings and details of Roeckner radial rolling mill (1s. 6d.).

BIOS 1713. The manufacture of isovaleric acid and bromisovalerylurea in the French zone of Germany (2s.).

BIOS/Misc. 63. Refining of light oil from coal gas (2s.).

FIAT T/B T-29. Some properties of silicon and titanium stainless steels (2d.).

FIAT T/B T-47. Electrical grades of German plastics (2d.).

FIAT 1141. Synthetic detergents and related surface active agents in Germany (11s.).

BIOS/JAP/PR/1664. Pyrite resources of Japan (2s.).

BIOS/JAP/PR/1639. Short report on production of cyanamide in Japan (1s.).

COATED FIBRE PRODUCTION

A LIMITED production of coated fibre is now being undertaken at Leith by British Plexon, Ltd., using the Plexon International Corporation (U.S.A.) method of coating. A new factory is being erected, and production will be expanded when it comes into operation. The system involves the impregnation and coating of yarns with a large number of light coatings which give flexibility to the yarn.

Although any base fibre can be used, rayon and nylons are preferred; 20 standard shades are being produced. The resultant fabrics are stated to be rot-proof, mildew-proof, resistant to perspiration, water, and some acids.

U.S. TO REFINE BRITISH COPPER

A REPORT from New York states that in the first half of this year Britain has arranged to send about 20,000 tons of blister copper from Northern Rhodesia for refining into electrolytic copper at the Phelps Dodge plant in the U.S.A.

The first shipment of refined copper to be received in Britain is expected next month and this country will have the option of paying the refining fees either in dollars or in an equivalent value of refined copper.

CZECH STEEL AND COAL

CZECHSLOVAKIA'S iron and steel production in 1947 was higher than scheduled in the Two-Year Plan. Pig iron output, stated to have totalled 1.4 million metric tons, and equal to 106.1 per cent of the plan and 48 per cent above the 1946 level, was 15 per cent below the 1937 figure of 1,675,100 tons. Steel output at 2.28 million tons was equal to 103.98 per cent of the target figure, *i.e.*, 36.3 per cent higher than last year, and less than 1 per cent lower than the 1937 output of 2.3 million tons.

Coalmining industry is stated to have achieved 99 per cent of its 1947 target for hard coal and up to 102 per cent for brown coal.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BRIDGE MILL RUBBER CO., LTD., Blackburn. (M., 27/3/48.) February 19, mortgage and charge to Midland Bank, Ltd., securing all moneys due or to become due to the bank; charged on land and premises with mill and house thereon at Moorgate Street, Blackburn, together with machinery, fixtures, etc., and a general charge. *£1600. June 25, 1947.

STEEL CITY SUPPLY CO., LTD., Sheffield. (M., 27/3/48.) February 23, mortgage to National Provincial Bank, Ltd., securing all moneys due or to become due to the bank; charged on land at junction of Brightside Lane with East Coast Road, Sheffield, with erections and buildings thereon known as Celtic Works, together with plant, machinery, etc. *—. December 13, 1946.

Satisfactions

EDWIN TAYLOR (CHEMICALS), LTD., Manchester. (M.S., 27/3/48.) Satisfaction February 28 of debentures registered July 1, 1941, to the extent of £250.

SATINITE, LTD., Widnes, chemical manufacturers. (M.S., 27/3/48.) Satisfaction March 1 of charge registered June 20, 1946.

Company News

Boots Pure Drug Co., Ltd. states that it will not recommend a total distribution for 1947-48 exceeding that for 1946-47

The nominal capital of **Frome Chemical Company, Ltd.**, South Parade, Frome, has been increased beyond the registered capital of £1500 by £500 in £1 ordinary shares.

Egyptian Salt and Soda Co., Ltd. reports a balance of profit for the year ended August 31, 1947, of £233,023—which will permit a distribution of 4s. 6d. gross per share.

Metal Industries, Ltd. has acquired more than 98 per cent of the issued share capital and funding certificates of Fawcett Preston & Co., Ltd., general engineers, Bromborough Port, Cheshire.

The nominal capital of **British Liquid Inks, Ltd.,** manufacturers of photogravure, printing and other inks, etc., 5 Hind Court, London, E.C.4, has been increased beyond the registered capital of £2000, by £2000 in £1 7½ per cent cumulative preference shares.

British Industrial Plastics, Ltd. has withdrawn its proposal for converting the company's £14,820 of 10 per cent tax-free preference shares into ordinary shares This is due to opposition from holders of the preference shares.

The directors of **British Celanese, Ltd.** announce that, in view of the Government's requests, they do not intend to recommend any increase in the rate of dividends which may be declared during the 12 months ending February 28, 1949.

The nominal capital of **Cheseborough Manufacturing Co., Ltd.,** manufacturers of petroleum jelly, petroleum and petroleum by-products, etc., Victoria Road, Willesden Junction, London, N.W.10, has been increased beyond the registered capital of £75,000, by £25,000, in £1 ordinary shares.

New Companies Registered

Kirby Stores, Ltd. (450,918).—Private company. Capital £500. Manufacturers of chemical, industrial, medicinal and other solvents, compounds and preparations, soaps, etc. Reg. office: 17 Manchester Square, W.1.

Chemical and Allied Stocks and Shares

MARKETS have remained firmer, although international developments and the impending Budget made for caution, and business in most sections was again on very limited lines. Industrial shares were favoured in cases where yields are still attractive on the basis of last year's dividends. In a few instances, however, there was a further reaction, largely confined to shares which had been the subject of higher dividend hopes, now apparently dispelled by the request to limit payments to last year's rates. British Funds have made further progress at the time of writing, attributed to official support preparatory to the impending issue of British Electricity stock.

There have been active dealings in Albright & Wilson 5s. units, which at 28s. 9d. commanded a premium of 9d. over the issue price, regarded as a good achievement in the inactive market conditions ruling. The prospectus forecasts a dividend of 25 per cent, on which basis there is an attractive yield of over 4⅜ per cent at the

current price. Imperial Chemical have been active, and have risen further to 48s. 6d. at the time of writing, reflecting continued market confidence that a total of 10 per cent will again be paid for the year. There was a good rally to 51s. 9d. in United Molasses, while the 5s. units of the Distillers Co. strengthened to 27s. 6d. Turner & Newall were 76s. 7½d., British Oxygen 96s. 3d. while reflecting the unexpected increase in the dividend to 5 per cent. Amalgamated Metal shares have rallied to 19s. 7½d. Imperial Smelting were 23s. 9d., B. Laporte 5s. units again firm at 21s. 10½d., with W. J. Bush ordinary 83s. 9d., and Fisons were dealt in around 60s. On the other hand, the dividend restriction request reacted further on Glaxo shares, which eased to £18 to yield only 3⅜ per cent on the basis of last year's dividend. Another share which has been the subject of higher dividend hopes that will now apparently have to be given up is British Drug Houses 5s. ordinary. The price eased to 10s. 6d. and the yield is 3⅜ per cent, last year's dividend having been 8 per cent. Markets are in a very uncertain state, which is only natural in view of the forthcoming Budget, but the position and outlook may be more clearly defined after the Chancellor's statement. It is generally agreed that voluntary dividend limitation at last year's rates as proposed by the F.B.I. would be more preferable to another increase in the Profits Tax.

Textile shares have attracted more attention, although it is realised that dividend limitation will keep payments down to last year's levels. Iron and steels gained a few pence where changed, buyers being attracted by the good yields, giving little attention to the threat of nationalisation which apparently still lies ahead. United Steel were 29s. 6d., yielding 5⅜ per cent, Colvilles 30s. 7½d. at which the yield exceeds 5⅛ per cent, and Dorman Long at 31s. return over 5 per cent.

Boots Drug have been firmer at 52s. and Beechams deferred improved to 21s. 9d., while Griffiths Hughes were 35s. Borax Consolidated changed hands up to close on 60s. and were again favoured with shares of other companies with important interests in the United States. British Glues & Chemicals 4s. shares have been steady at 18s. 9d. Following news of the proposal to increase the capital and borrowing powers, Greeff-Chemicals Holdings 5s. shares remained steady at 18s. 9d. Oils have rallied after their recent reaction, although sentiment did not appear to benefit from City reports that the Petroleum Board may be dissolved next June. Anglo-Iranian rallied to £8½ and Shell were 76s. 3d.

British Chemical Prices

Market Reports

A CONTINUATION of active trading conditions has been reported this week in virtually all sections of the industrial chemicals market, with the tightness in supplies in some directions restricting what would otherwise have been a substantial turnover. Contract specifications are being met with promptness and a fair volume of overseas inquiries has found its way to the order books. The price position remains strong and it is not yet possible to say to what extent prices can be reduced or even pegged to conform with the views of the Government. Pressure for supplies for export has been noticeable in the soda products section and here, as well as in other sections, notably dyestuffs, the difficulty is to meet essential home needs and at the same time satisfy the demand for shipment. Arsenic, formaldehyde, bleaching powder and the barium compounds are all active items. The call for the coal-tar products continues to be in excess of available supplies, although a good export demand for pitch, mainly for France, is being met and shipments of creosote oil and cresylic acid are reported to be satisfactory.

MANCHESTER.—Steady trading conditions have been reported in most sections of the Manchester chemical market during the week, although the usual seasonal lull is anticipated from the end of the present week until the middle of the next. Home textile and allied trades have maintained steady pressures for supplies of bleaching and finishing chemicals and delivery specifications have been coming through regularly from other industrial users. Export demand for a fairly wide range of products has been well maintained at its recent level. There is a brisk call for supplies of most of the fertiliser materials, and in the by-products market a steady absorption of both the light and heavy distillates continues to be reported.

GLASGOW.—In the Scottish chemical market conditions have been a little more active during the week. Interest of the paint trade in pigments and dry colours has been noted and this appears to be due to some uncertainty about future supplies. The demand for chemicals used for fertilisers is steadily increasing. In the export market there has been a very heavy demand for bleaching powder, with negligible supplies available to meet it. Argentine importers have been prominent with inquiries for those chemicals which were named in the recent trade agreement with that country. In general the position has shown a certain stability and future prospects are about the same.

Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted may be obtained from the Patent Office, Southampton Buildings, London, W.C.2., at 1s. each.

Complete Specifications Open to Public Inspection

Chemical process.—American Bemberg Corporation. Aug. 8, 1946. 20833/1947.

Preparation of pteridines.—American Cyanamid Co. Aug. 10, 1946. 18462/1947.

Preparation of unsaturated acid esters.—Bakelite Corporation. Aug. 8, 1946. 20331/1947.

Moulding and laminating compositions.—British Industrial Plastics, Ltd. July 19, 1946. 30020/1947.

Manufacture of dyestuffs of the anthraquinone series.—Ciba, Ltd. Aug. 7, 1946. 21419-21/1947.

Manufacture of a raw material for lacquers from resinous ethylene oxide derivatives of phenols and lacquers made therewith.—Ciba, Ltd. Aug. 8, 1946. 21617-18/1947.

Polymerisable materials and the polymerisation thereof.—E.I. Du Pont de Nemours & Co. Aug. 7, 1946. 21596/1947.

Production of chlorinated hydrocarbons.—E.I. Du Pont de Nemours & Co. Aug. 8, 1946. 21956/1947.

Production of organic halogen compounds.—E.I. Du Pont de Nemours & Co. Aug. 8, 1946. 21957/1947.

Production of organic halogen compounds.—E.I. Du Pont de Nemours & Co. Aug. 8, 1946. 21958/1947.

Preparation of 1 : 4-dihalobutanes.—E.I. Du Pont de Nemours & Co. Aug. 8, 1946. 21959-60/1947.

Production of melamine.—E.I. Du Pont de Nemours & Co. Dec. 28, 1944. 2524/1948.

Diazotype layers containing resorcinol mono-ethers.—General Aniline & Film Corporation. Aug. 7, 1946. 19537/1947.

Production of glycosides.—E. Lilley & Co. Oct. 23, 1942. 23798/1945.

Preparation of acyl derivatives of rhizopterin and aporhizopterin.—Merck & Co., Inc. Aug. 10, 1946. 17976/1947.

Synthesis of adrenal cortical hormone.—Merck & Co., Inc. July 14, 1945. 19044-45/1947.

Processes for preparing high molecular weight condensate resins or polymers, and the improved compositions resulting therefrom.—Monsanto Chemical Co. Aug. 9, 1946. 19239/1947.

Reaction of organic mercaptans with formaldehyde and ammonia.—Monsanto Chemical Co. Oct. 9, 1945. 2471/1948

Thermo-hardenable organosilicic resins.—Soc. des Usines Chimiques Rhone-Poulenc. July 27, 1946. 29700/1946.

Process for the production of polyhydric alcohols and allyl alcohol, or esters thereof, from ethylene.—S. Olsen. Aug. 8, 1946. 20361/1947.

Production of thiophene.—Socony-Vacuum Oil Co., Inc. Sept. 28, 1944. 3278-79/1948.

Method of preparing highly efficient insecticides for direct application to the skin of man and animals.—Stanco, Inc. May 30, 1942. 2554/1948.

Method of re-activating finely divided catalyst.—Universal Oil Products Co. April 22, 1940. 2975/1948.

Acetylene generators.—Volcan Soc. Anon. Aug. 1, 1946. 34158/1946.

Process.—E.I. Du Pont de Nemours & Co. Aug. 1, 1946. 20404/47.

Stabilisation of formaldehyde.—E.I. Du Pont de Nemours & Co. Aug. 1, 1946. 21005/47.

Manufacture of copperable polyazo dyestuffs.—J. R. Geigy A.G. Aug. 2, 1946. 20931/47.

Manufacture of copperable polyazo dyestuffs.—J. R. Geigy A.G. Aug. 2, 1946. 20932/47.

Azamerocyanine dyes and a process for the preparation thereof.—General Aniline & Film Corporation. July 16, 1946. 8835/47.

Method of producing formaldehyde condensation products.—Harvel Research Corporation. Feb. 24, 1943. 1389/48.

Friction elements.—Harvel Research Corporation. May 27, 1941. 1390/48.

Treated soya-bean oil and methods of treating same to produce drying characteristics therein.—Harvel Research Corporation. Dec. 21, 1940. 1716/48.

Treated cottonseed oil and method of producing same.—Harvel Research Corporation. Dec. 21, 1940. 1717/48.

Production of potentially heat reactive thermosetting resins and infusible resins and resinous products obtainable therefrom.—Harvel Research Corporation. April 23, 1943. 1718/48.

Resinous products and methods of producing the same.—Harvel Research Corporation. March 27, 1942. 2271-72/48.

Self-supporting films comprising vinyl resins.—I.C.I., Ltd. Aug. 1, 1946. 21003/47.

New polymerisable esters and polymers produced therefrom.—I.C.I., Ltd. Aug. 1, 1946. 21004/47.

Paradichlorobenzene.—Koppers Co., Inc. July 24, 1946. 4358/47.

Insecticides.—Mathieson Alkali Works. July 27, 1946. 13446/47.

Separating constituents of coke oven gases.—Koppers Co., Inc. July 23, 1946. 8838/47.

Apparatus for heating liquids.—N.V. de Bataafsche Petroleum Maatschappij. July 25, 1946. 4526/47.

Preparation and use of agents for combating noxious organisms.—N.V. de Bataafsche Petroleum Maatschappij. June 24, 1946. 14453/47.

Process for the preparation of chloral from chloral alcoholate.—N.V. de Bataafsche Petroleum Maatschappij. Aug. 2, 1946. 16707/47.

Method for preparing soluble allyl starch.—P. L. Nichols, P. E. Meiss, and E. Yanovsky. April 20, 1944. 2284/48.

Thioethers and methods for obtaining the same.—Parke Davis & Co. Aug. 5, 1946. 19940-41/47.

Solvent extraction of glyceride oils.—Pittsburgh Plate Glass Co. Jan. 17, 1939. 739/48.

Process for the preparation of water-soluble dyestuffs of the phthalocyanine series.—Sandoz, Ltd. Aug. 1, 1946. 20648/47.

Continuous production of products with a base of mineral or organic fibres.—Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St. Gobain, Chauny & Cirey. June 3, 1946. 35344/47.

Producion of fibres from thermoplastic materials such as glass.—Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St. Gobain, Chauny & Cirey. May 31, 1946. 35345/47.

Production of fibres from thermoplastic material such as glass.—Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St. Gobain, Chauny & Cirey. June 4, 1946. 35346/47.

Treatment of the liquids obtained from the pickling of iron with acids.—Soc. de Chimie Appliquée aux Mineraux (S.C.A.M.). July 23, 1946. 35372-73/47.

Processes for manufacturing synthetic resin.—Soc. Generale des Huiles de Petrole. July 30, 1946. 28149/46.

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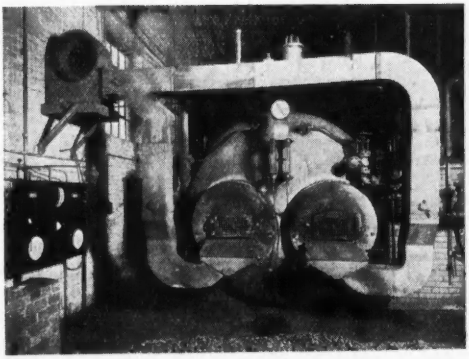

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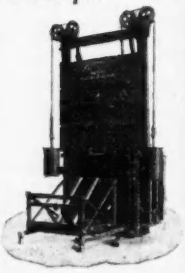
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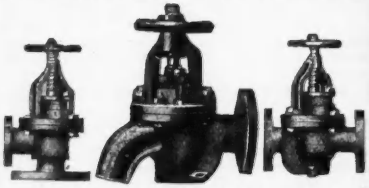
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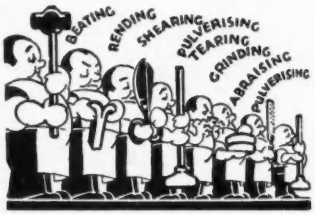

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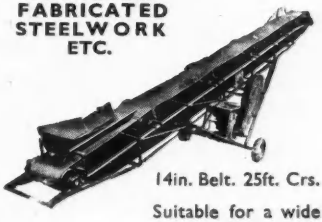

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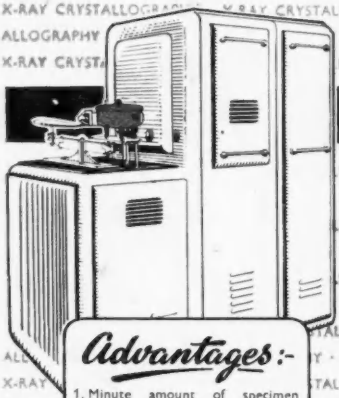

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